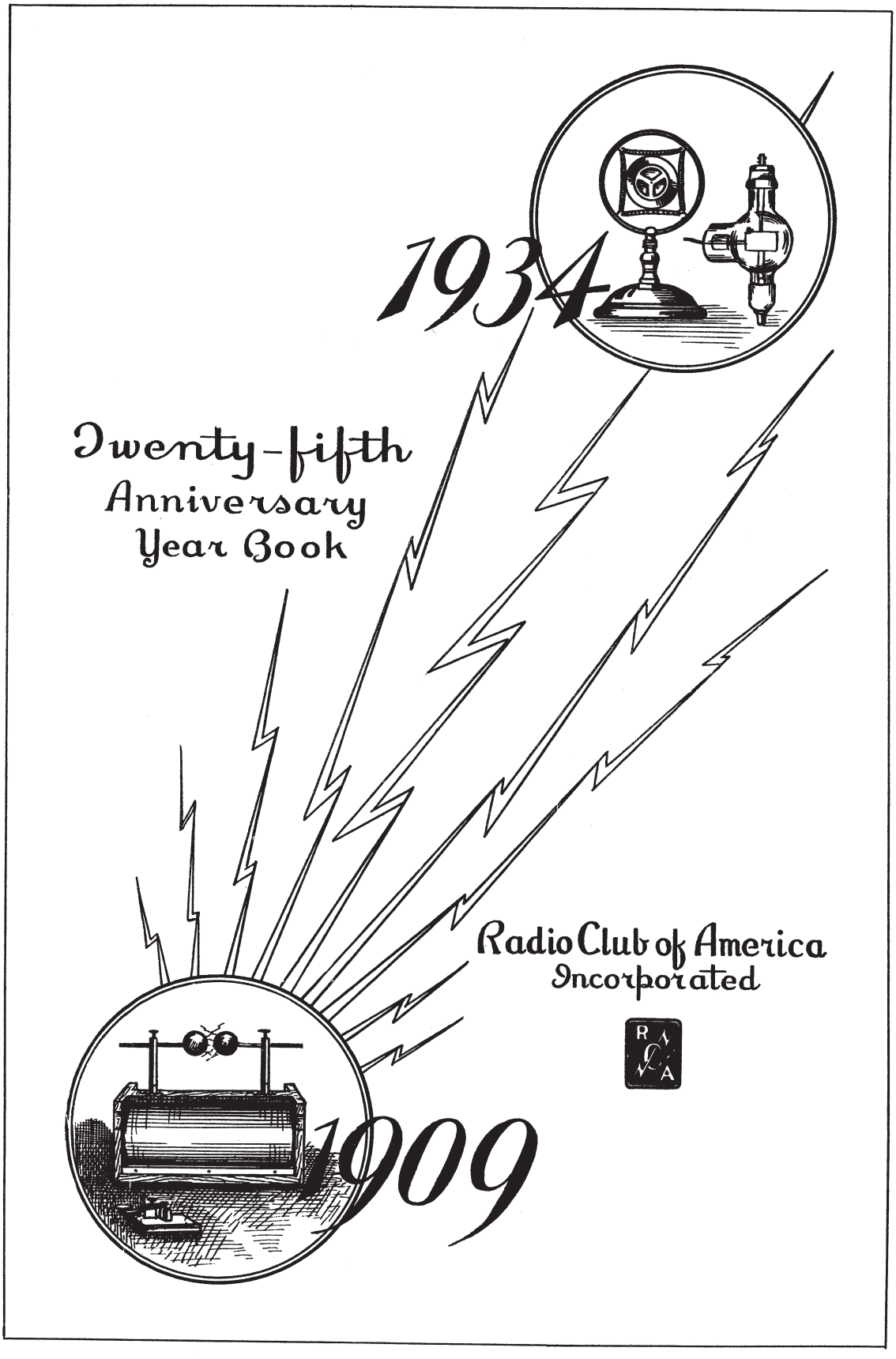


Cover design of Silver Year Book 1934.

RADIO CLUB OF AMERICA

Incorporated

Founded 1909

TWENTY-FIFTH ANNIVERSARY YEAR BOOK

1934

Executive Headquarters

11 West 42nd Street

New York City

Copyright, 1935
Radio Club of America, Inc.
All Rights Reserved.

TWENTY - FIFTH ANNIVERSARY YEAR BOOK COMMITTEE

GEORGE E. BURGHARD, *Chairman*
ERNEST V. AMY
EDWIN H. ARMSTRONG
GEORGE J. ELTZ, JR.
JOHN F. GRINAN
LAWRENCE C. F. HORLE
FRANK KING
ROBERT H. MARRIOTT
FRED MULLER
JOSEPH J. STANTLEY
W. E. D. STOKES, JR

PREFACE

In preparing this, our twenty-fifth anniversary number, the Committee have a keen appreciation of the responsibility imposed upon them by the membership.

Twenty-five years represent practically the entire life span of that most fascinating of the communication arts,—Radio. Our membership has contributed more than its share to the perfection of the science as it is known today. Statistics are therefore available in vast array ready for sorting, sifting, and compilation into neat paragraphs,—that no one will read.

The committee had to decide whether we should prepare a statistical type of anniversary number or whether we should attempt, to the limit of our poor powers, to incorporate in the book some of that spirit which led to the foundation of the club and to which can largely be attributed its continued existence.

To the members of the committee the answer seemed more than obvious, statistics could not be ignored, they were important, yes, but only as the limbs of a tree are important. Statistics are the result of growth just as are the limbs of a tree, it is the spirit, the upward urge that is responsible for both.

In no engineering association is the spirit of growth, the urge to seek new pastures as strongly emphasized as in the Radio Club of America, Inc. Founded in 1909 by a group of school boys whose sole bond, when the club was formed, rested in their interest in "Wireless", the club has continued ever since with that bond as its strongest and greatest asset.

The school boys have grown up, they are now middle-aged men, but when they meet, as they do very frequently, the same spirit, the identical urge to find something new in "Wireless" is always present. If the founders of this club and its early membership bequeathed anything to the club it was this spirit of unrestrained curiosity and willingness to reveal to others without hesitation the results of personal experiments in the beloved art.

There is something big, something cosmic, about radio that washes away the petty things that so trammel other arts and sciences. The rich and the poor, the wise man and the student, meet through the medium of the ether and are comrades. This is the spirit of your club, treasure it, foster it, for when it dies the club dies with it.

When the club was founded radio was an unknown quantity, almost a plaything. How it has developed, the part it played in the World War and the position it holds in the world today is known to all of us. It has been exploited by big business, fortunes have been made and lost in it but the bond that founded the Radio Club is still good. Radio, to those who truly understand its spirit, is above exploitation.

There is no other radio association quite like the Radio Club, no other group quite so free of the commercial taint, old and young, we are amateurs when we meet in the Radio Club, let us remain so.

The statistics on our membership have been cut to the barest possible outline. A glance through the membership list will reveal the reason for this. To do full justice to the achievements of some of our members would require a volume many times thicker than we could afford. It is our desire to slight no one, rather are we actuated by that amateur bond which attributes to each in equal measure, the same spirit, the same desire for development, regardless of past achievements.

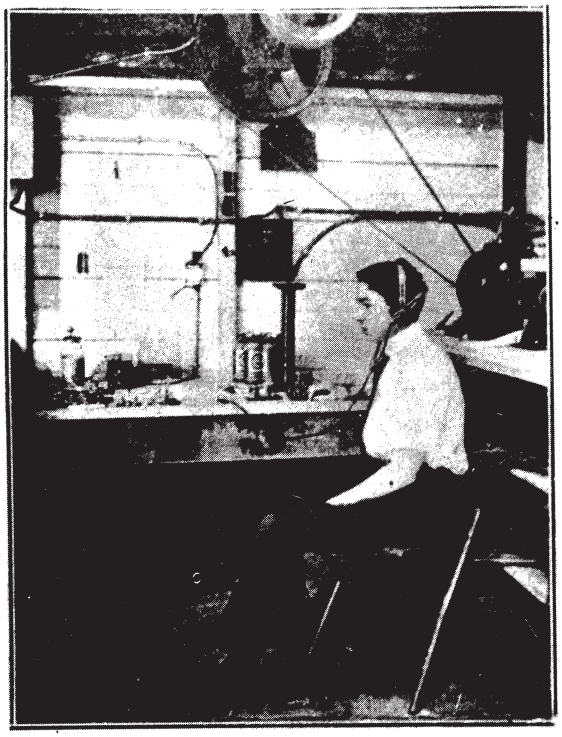
It is in this spirit that your committee present to you your twenty-fifth anniversary year book.

GEORGE ELTZ, JR.

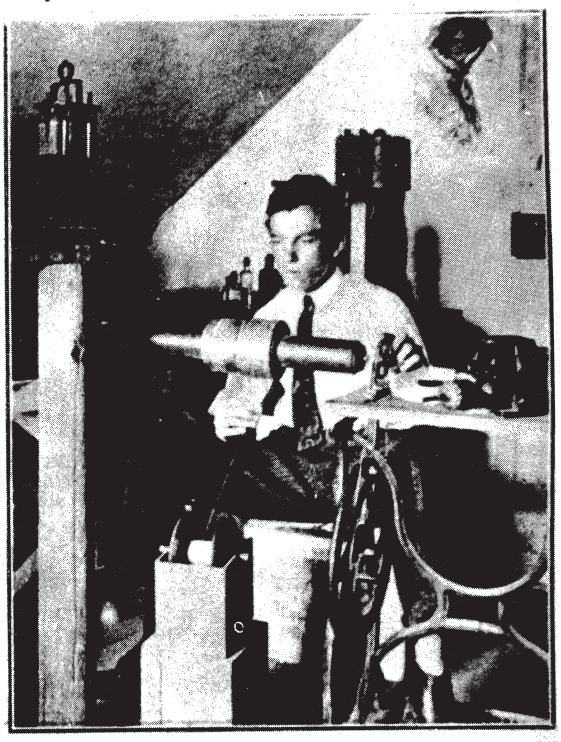
Page 4 The Saturday Evening Mail, New York, July 24, 1909.

INSPIRED BY THE SPIRIT OF SCIENCE

Enterprising Boys Who Make and Operate Their Own Wireless



FRANK KING, AGE SEVENTEEN, OF NEW YORK, HAS MASTERED THE MORSE CODE AND IS STUDYING THE CONTINENTAL.



FAITOUTE MUNN, OF EAST ORANGE, N. J., AGE SEVENTEEN, IS HERE SEEN USING AN OLD SEWING MACHINE TO WIND HIS COIL.

Photos copyright, 1909, by Underwood & Underwood

These pictures appeared in The Saturday Evening Mail of July 24, 1909. Both Frank King and Faitoute Munn were founders of The Junior Wireless Club, Ltd.

A meeting was called by Mr. W.C.D. Stokes, Jr., at the Ansonia, New York City, on January 2nd 1909, for the purpose of discussing the organization of a club whose objects should be devoted to the interests of wireless telegraphy and telephony.

There were present: Messrs. W.C.D. Stokes, Sr., W.C.D. Stokes, Jr., George Clty, Frederick Seymour, Frank King, Fortesque Munn, and Miss C. Lillian Todd, Organizer of the Junior Aero Club of the United States.

The meeting was called together by Mr. W.C.D. Stokes, Sr., as Chairman, who stated the object of the proposed organization and made a brief address on the history of the Cable and the subject of the future of wireless telegraphy and telephony. At the close of his remarks Mr. Stokes presented a motion that those in favor of the formation of such a club signify their approval.

The motion was duly seconded, and unanimously carried.

Mr Stokes requested Miss Todd to state whether it was her idea that the new club be organized as a division of the Junior Aero Club of the United States, or as a separate association. Miss Todd stated that it did not seem desirable to hamper in any way the new club by any connection with the original organization, and that she would transfer the members present who were now members of the wireless division of the Junior Aero Club to the new club.

Mr Stokes then suggested that Miss Todd name the new club; she proposed the name already suggested by Mr. Stokes which was thereupon submitted to those present for consideration, and upon motion, duly made, seconded and carried, the name

Junior Wireless Club, Limited

was unanimously adopted.

The election of officers being next in order, upon motion duly made, seconded and carried, the following officers were unanimously elected; —

	(Proposed by)
Director General –	Mr W.C.D. Stokes – Miss Todd
Honorary President –	Miss C.L. Todd – Mr Stokes, Sr.
Consulting Engineer –	Prof. R.A. Fessenden – " " "
President –	W.C.D. Stokes Jr., – " H. Munn,
Counsel –	Mr Seymour – W. C.D. Stokes, Jr.
Recording Secretary –	W. Fortescue Munn. – Miss Todd
Corresponding Secy. –	Frank King – Mr. Clty,
Vice President –	George Clty – W.C.D. Stokes, Jr
Treasurer –	Frederick Seymour – F. Munn

Upon motion, duly seconded and carried, it was unanimously decided that the members present should be known as the Charter Members.

Mr Stokes, Sr, made a speech congratulating the members upon their new organization and gave them the privilege to hold meetings at the Ansonia. Mr Stokes then presented the club a sum with which to create a treasurer's fund. To this was added by Miss Todd, the membership fees that had been paid into the treasury of the Junior Aero Club, the members of that organization present being thereby transferred to the Junior Wireless Club, Limited.

Upon motion, duly made, seconded, and carried, it was decided that regular meetings be held on the first Saturday of each month at 3 o'clock P.M.

There being no more business to transact, the meeting adjourned.

Mr Stokes then invited the members of the Junior Wireless to luncheon.

Fortescue Munn

Facsimile of original minutes of the Junior Wireless Club, Lmtd., 1909.
This was the special meeting of the Junior Aero Club of the United States, held in the Ansonia Hotel, Jan. 2nd, 1909, at which the Junior Wireless Club Limited was formed and the first officers were elected.

JUNIOR WIRELESS CLUB, LTD.

EACH MEMBER MUST HAVE MADE HIS OWN STATION.

W. E. D. Stokes, Jr., Its President—Headquarters at the Ansonia Contains Much Apparatus—Club to Go to Washington to Oppose Pending Bill.

It is somewhat dangerous to attempt to enter the clubroom and experimental station of the Junior Wireless Club, Ltd. without a guide, for the officer in charge dispenses with the necessity of lock and key by having the knob charged with electricity to give the unexpected—and unexpecting—visitor what he terms a "nice little shock."

But when proper guidance is secured from the club's young president, who maintains headquarters at his home, the Ansonia, many marvels and intricacies may be observed with some degree of security. W. E. D. Stokes, Jr., president, aged 14 years, points out the pitfalls.

"Look out. Don't step on that zinc plate!" says he. "It's charged!" And you look out and don't step.

The clubroom and receiving station is imposing, almost formidable despite its somewhat small extent. In addition to the wireless telephone instruments at one side of the windows, the sending station across the way and the aerials connecting with three conduits above many other things more or less electric add to the effect. A big electric turning lathe occupies one side of the room; numerous vari-colored models of aeroplanes—which the manufacturer asserts really go when wound up—hang from wire complexities overhead; zinc plates, worse than they look, are not to be ignored.

In fact it is not safe to put a hand to the most innocent looking object unless first reassured. A big box beneath the battery and motor table filled with perfectly staid appearing earth and plants which thrive on the rays of a makeshift sun specially arranged out of a 100 candle power electric bulb is not what it would seem. Those plants—roots, branch, leaf or blossom—are electrified and emit sparks when invited. On the side walls high and low, on the ceiling and suspended therefrom, bulbs of every conceivable variety, shape and power transform the little room into an Aladdin cave of brilliancy.

"I'm always looking around at bulbs," says the president, "and when I see a new kind I try it."

So there they are, long and slim, short, fat and round, but all shining and bringing out dazzlingly the blueprints of scientific aspect which adorn one side of the wall, posters of the Postal Telegraph and Cable Company variety, illuminated letter placards bearing such legends as "No Smoking," "S. W. Co."—Stokes Wireless Company—and last but not least printed lists of wireless signal stations and steamers with wireless equipment.

These steamers and signal stations are all intimately acquainted with the experimental station of the Junior Club—too much so at times, it seems, when the Manhattan Beach station has to ask it to stop receiving for a time; for the Manhattan Beach station is less powerful and is retarded in receiving.

The young president puts the receiving headgear on your head

"Listen," he says. "They're talking to Manhattan Beach."

"How can you read it?" you ask.

"Listen," he says. "The spaces—da—da-da-da—da—can't you hear it?" And he becomes a trifle impatient at your stupidity. He discusses condensors, detectors, sensitive points and other appropriate topics for your enlightenment, but you are a poor subject.

Then the president tells how the Junior Wireless Club came to be, how it operates and what it intends.

About two years ago the Junior Aero Club, under the direction of Miss E. L. Todd, participated in the toy exhibition held at Madison Square Garden. Three of these youthful members, Frank King, Faitoute Munn and Frederick Seymour, specialized on wireless telegraphy and frequented Miss Todd's studio on West Twenty-third street to experiment. Each of them made his own wireless apparatus, and through the newspapers they invited any other boy to come and show a mechanical set he had made himself.

W. E. D. Stokes, Jr., then aged 12, had rigged up a wireless outfit which he brought forth to display and which Frank King helped him set up. Such books as the "A B C of Wireless Telegraphy" and "Electricity of Everyday Life" and possibly the random assistance of a random electrician were the principal sources of information.

The father of W. E. D., Jr., met the boys and invited them to his home to form a club. There the Junior Wireless Club, Ltd., came into being with headquarters at the Ansonia, there being just enough offices to go around among the charter members. W. E. D. Stokes, Jr., was made president; George Eltz, 441 West Forty-seventh street, vice-president; Faitoute Munn, East Orange, N. J., recording secretary; Frank King, 326 West 107th street, corresponding secretary; Frederick Seymour, East Orange, N. J., treasurer. Miss E. L. Todd was made honorary president, Prof. R. A. Fessenden of Brant Rock, Mass., was chosen as consulting engineer, and Seymour, Seymour & McGrath, 71 Broadway, as general solicitors and patent attorneys. Thus from the start the club's letterheads presented a complete and dignified appearance and are as yet unchanged, although the club has extended its membership to thirteen.

At 10 A. M. the first Saturday of each month from October to May the club holds meetings at the Ansonia, goes through the regular preliminary business, acts on the business letters received and the applications for membership, talks over schemes and, most of all, works with the wireless. The necessary qualification for membership is that the applicant has himself made his own wireless apparatus; later he may have assistance and more elaborate mechanical contrivances, but the first rule is inviolable.

They first memorize the Morse code until they are able to think in dots and

W. E. D. STOKES, JR., AND HIS WIRELESS TELEGRAPH.

This article appeared in the New York newspapers early in 1910. The illustration shows "Weddy" Stokes, first President, at the official Junior Wireless Club station in the Hotel Ansonia.

A HISTORY OF THE RADIO CLUB OF AMERICA, Inc.

By GEORGE E. BURGHARD

Part I

The story of the Radio Club of America begins over a quarter of a century ago, during the really dark ages of the radio art, about 1907.

Here we find a group of small boys, who according to the true American spirit, were so interested in flying that they formed the Junior Aero Club of U. S. under the leadership of Miss Lillian E. Todd. The names of the boys, who were in their early teens, were: Frank King, W. E. D. Stokes, Jr., George Eltz and Frederick Seymour. The members of the club made model planes and attempted to fly them at the regular meetings which were held in a convenient armory. Of course the science of flying was in its infancy at that time, and although their tests were not particularly successful, they were none the less commendable.

In conjunction with their experiments in aviation, these youngsters had, for some time, also been interested in what was then known as WIRELESS. In fact, the new idea of sending messages without wires had proved itself so fascinating, that they found themselves actually devoting most of their spare time to tinkering with wireless apparatus. There were at this time a small number of so-called amateur wireless experimenters in and about New York City, so the boys decided to form a new club with wireless as an object.

Accordingly, Mr. W. E. D. Stokes, Sr., called a special meeting of the Aero Club, for the purpose of forming a new club, with wireless telegraphy and telephony as its main interest. This meeting was held at the Hotel Ansonia in New York City on January 2nd, 1909. There were present Messrs. W. E. D. Stokes, Sr., W. E. D. Stokes, Jr., George Eltz, Frederick Seymour, Frank King, Faitoute Munn, and Miss Todd, the organizer of the Junior Aero Club.

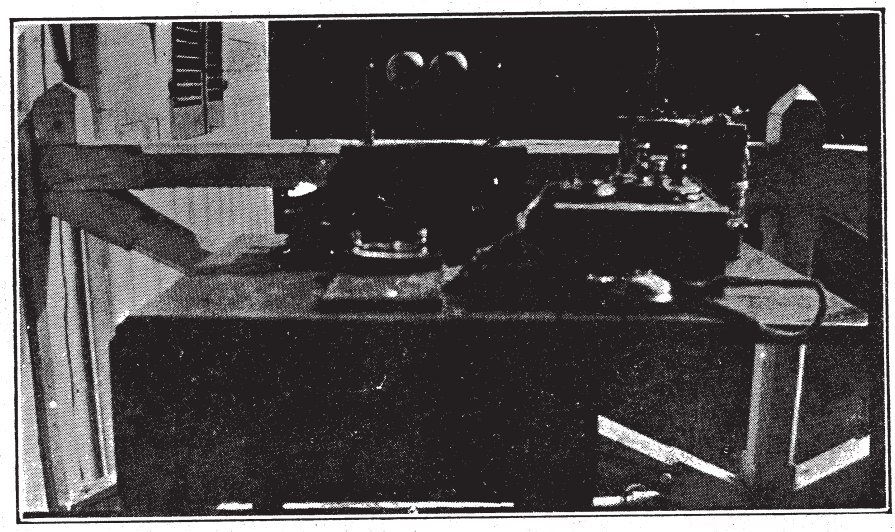
It was unanimously decided to form a new organization to be devoted entirely to Wireless. Thus, the Junior Wireless Club Limited was founded, and the following officers were elected:

Director General—W. E. D. STOKES, SR.
Honorary President—MISS E. L. TODD
Consulting Engineer—PROF. R. A. FESSENDEN
President—W. E. D. STOKES, JR.
Counsel—MR. SEYMOUR
Vice-President—GEORGE ELTZ
Recording Secretary—W. FAITOUTE MUNN
Corresponding Secretary—FRANK KING
Treasurer—FREDERICK SEYMOUR

It was also unanimously decided that these members should be known as the Charter Members.

Of course, the early days of Radio were indeed days of pioneering and darkness,—Days when traffic had to be handled with a coherer and a straight gap spark transmitter. There were no books or magazines to guide these boys, but they held regular monthly meetings at the Ansonia, where "Weddy" Stokes lived, on Saturday afternoons, and by swopping information gained the necessary knowledge to build their own receivers and transmitters. The fascination of sending messages through space without wires, readily took hold of the younger generation, and small boys began to enveigle their parents into giving them money with which to buy wire and other material to build sets in imitation of

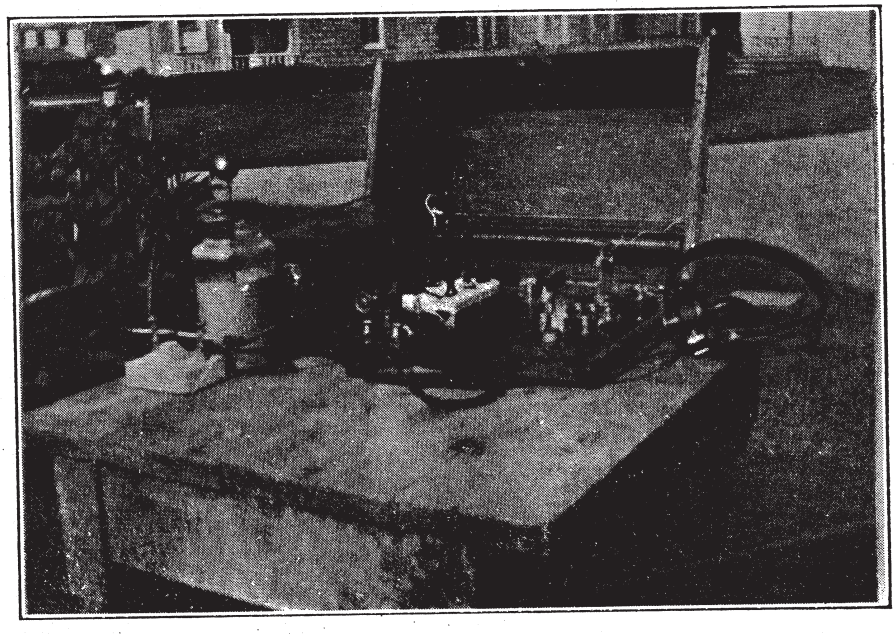
those used by the commercial companies. Their efforts were gallant indeed, and the results were successful in some cases, where the frequency of the transmitter happened by chance to be somewhere near that of the receiver, or someone had gained expert knowledge from the operators at Manhattan Beach or the Waldorf Astoria, where the main commercial land stations were located. With



Ernest Amy's station, "EA", at Rumson, N. J., 1907.
A typical station of the old Coherer days, with one inch spark coil and round ball spark gap.

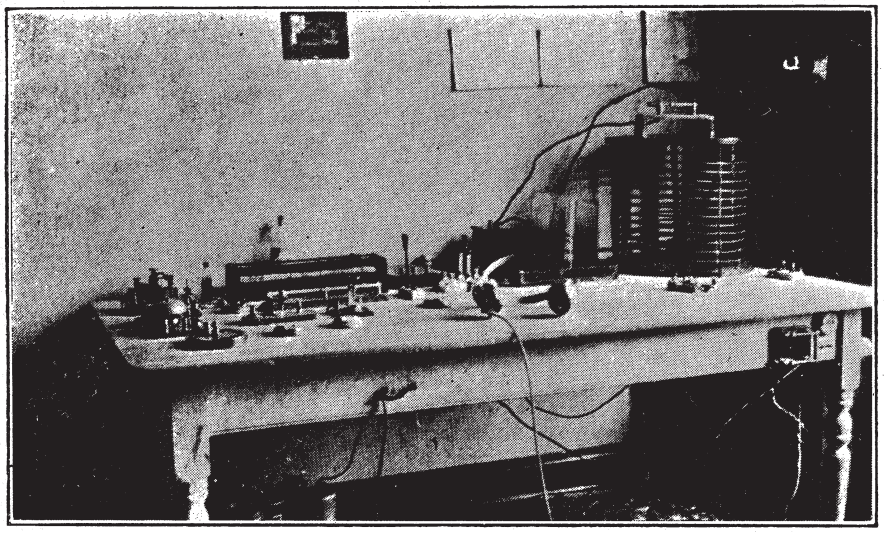
the crude apparatus and the embryo knowledge available, it was really remarkable that these boys could communicate at all, but almost any night one could hear messages being exchanged between stations in New York City, covering distances of at least a mile or two.

The amateur in these days, of necessity, had to build his own set, since there were no manufacturers other than the Commercial companies. Occasional articles on commercial stations, as they then existed, appeared from time to time,



Frank King's portable "FK" at Long Branch, N. J., 1907.

and each new idea presented, was added to the experimenter's stock of knowledge. The success of each experiment was passed by word of mouth to the other amateurs and eagerly followed. The Coherer, and in a few cases the Marconi Magnetic Detector, were the detectors in use at that time. All tuning was accomplished by means of sliders on coils of wire wound on the handiest form obtainable, very often being nothing more nor less than a broomstick, rolling



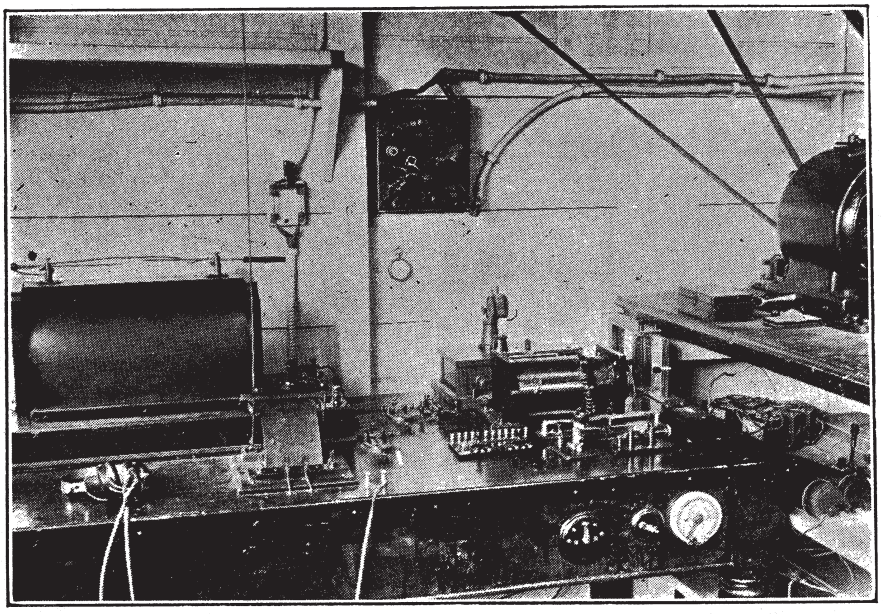
Station "EA", E. V. Amy, 48 West 70th St., N. Y. C., 1909.
Dry batteries, with a mechanical interrupter, were used as a power supply. Note the slide-wire tuner, potentiometer, and the glass plate transmitting condensers.

pin, or convenient carpet pole. Variometers and variable condensers were then unknown to the amateur.

The transmitters consisted of spark coils, mostly home made, and operated with a mechanical interrupter which was subsequently replaced by the electrolytic type. Most of these interrupters were home made, and lucky was the boy who could boast of the possession of a platinum point neatly sealed in a glass tube.

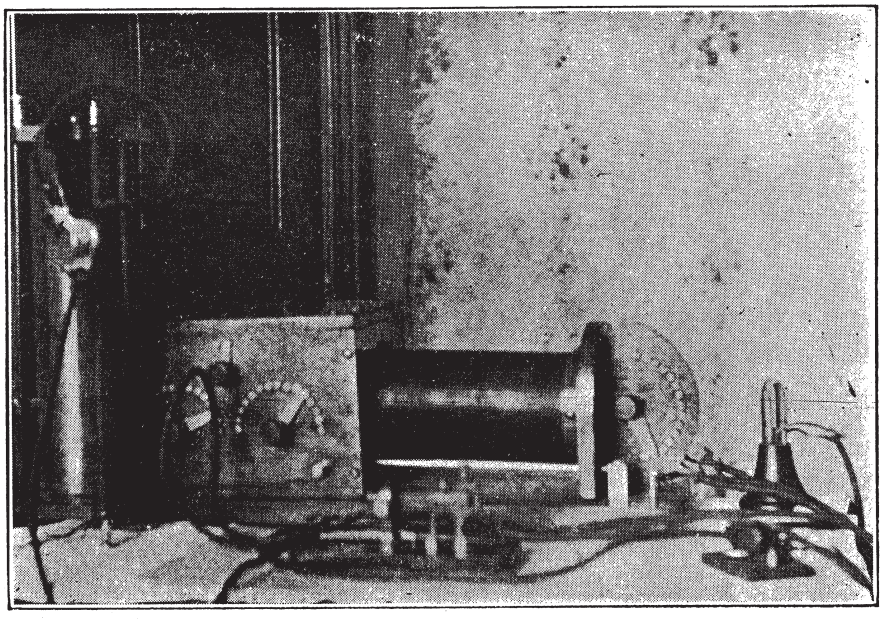
George Burghard at station "EB", 1 East 93rd St., N. Y. C., 1910.
The apparatus was mostly home-made, the "Helix" in particular, which was suspended from the ceiling by a string to insure good insulation.

Many were the amusing incidents which occurred. One boy desiring to erect the best possible antenna, ran across an article describing the aerial used by the Marconi Co. at its station on Cape Cod. It was in the shape of a huge



Station "FK", Frank King, 326 West 107th St., N. Y. C., 1911.
The birth place of the Radio Club of America, Inc. The station was located in the shack in Frank's back-yard where the special meeting of the Junior Wireless Club was held on Oct. 21st, 1911, at which the name was changed to Radio Club of America, Inc.

square funnel, the upper ends or rim of which were insulated. Accordingly, he very carefully built a miniature copy only four feet on one side, and six feet high, not realizing the difference in electrical constants between the Cape Cod



Harry Houck's station, New York, 1910.
Note the home-made loose coupler, which was a prized possession at that time.

aerial and his miniature model. Needless to say, the small imitation of the real thing didn't work very well, and it was only by chance, that the amateur discovered that, a stretch of bell wire was far more efficient.

Several experiments were also made with kite aerials. A kite was flown from the roof of a city house. When the kite had reached a height of several hundred feet, a severe static shock was received by the young man holding the wire, much to his chagrin and the amusement of the party. One member proudly announced that he wouldn't get a shock from the wire because he had on rubber heels, and walked about the tin roof with his toes in the air. The manipulator of the kite rather doubted the insulating qualities of rubber heels as against static charges, and at a favorable moment brought the wire in contact with the boastful young man's ear. The result was a neat little spark and a resounding yelp from the wise young fellow, despite his O'Sullivans. Irrespective of shocks and static, however, the kite antenna proved a great success for reception.

Naturally the activities of these amateur experimenters aroused considerable interest, and it was not long before the Government began wondering what could be done to control these newcomers. The idea of restricting the free air had never occurred to anyone before, but the result was a bill introduced by Senator Depew in 1910, practically prohibiting amateur experimenting. This bill, naturally the first of its kind, would surely have spelled the death of all amateur Radio had it not been for the quick action of the Junior Wireless Club. The club opened hostilities by the following letter to Senator Depew in reply to his letter of March 17th, 1910:

New York, March 19, 1910.

Hon. Chauncey M. Depew,
U. S. Senate,
Washington, D. C.

My Dear Sir:

Yours of March 17th to our President is before us. We think you must have been misinformed that malicious orders were sent to the Fleet by Amateur Wireless Operators.

In the 1st place,—All messages and orders to the Navy should be in cypher.

2nd. Any skilled government operator knows the touch and tone of every other government operator, just as you know the voice of your wife from the voice of your son, or a Bank Cashier recognizes the signature of Smith from the signature of Brown.

3rd. If our Government used only certain wave lengths, they should be able to tune out all other interferences, except their own wave length provided they were supplied with an up-to-date plant.

At the Narraganset Bay there were certain Naval tests made about two years ago, and the various so-called Wireless Companies wanted to get the first news to the newspapers of these tests, so as to boom their companies' stocks, and to say the news was received first through their Company, and when some of them found they were unable to cut out interference between themselves, in order to prevent other Wireless Companies from getting the news first they sent a lot of fake messages of confused dashes.

Only a few of the so-called Wireless Companies have efficient methods of cutting out interferences, and these are the Companies that are now crying the most for protection.

You probably have heard of the tests made last year between Glace Bay, N. S., and Clifton, Ireland, when the National Signaling Co. picked up the messages, which Marconi, on the test, was unable to deliver between their own stations, from both Glace Bay and Clifton, Ireland, in spite of the fact that the Marconi Company kept up a constant interference of dash, dash, dash from their Cape Cod station for 48 hours without interruption, but the National Signaling Co. paid no attention to such interference and picked up all the messages, which Marconi was unable to exchange between their own stations, and all these messages were handed over to Lord Northcutt at the Hotel St. Regis.

What the Navy needs is an up-to-date plant and system that will operate at all seasons of the year, at all times of the day or night, and under all atmospheric conditions of the weather, and will send not less than 1000 miles and receive not less than 200 miles.

Our Government should have a well paid intelligent staff of operators, and a secret cypher system of communication like that of the British Admiralty,—then there would be no talk of amateur interference.

Since the day that boy at Portsmouth, Me., received the first news from the Connecticut of the return of the Fleet from its trip around the world, these so-called stock-jobbing Wireless Companies have been unable to sell their stock, and have done nothing but pound us boys.

We, the undersigned, a Committee of The Junior Wireless Club Ltd. of America, would like to be heard on this proposed bill, and we will come to Washington, if we are allowed to do so, and if it can be arranged so that we can come on a holiday.

Yours respectfully,

THE JUNIOR WIRELESS CLUB, Ltd.,
GEORGE ELTZ, Jr.,
W. FAITOUTE MUNN,
FRANK KING,
FREDERICK SEYMOUR,
HARLOWE HARDINGE,
Committee.

TO REGULATE RADIO COMMUNICATION

HEARINGS

APRIL 28, 1910

ON THE BILL (S. 7243) TO REGULATE RADIO COMMUNICATION

BEFORE THE

COMMITTEE ON COMMERCE OF THE SENATE OF THE UNITED STATES

SIXTY-FIRST CONGRESS, SECOND SESSION

CONSISTING OF

WILLIAM P. FRYE, of Maine, *Chairman.*

STEPHEN B. ELKINS, of West Virginia.	JONATHAN BOURNE, JR., of Oregon.
KNUTE NELSON, of Minnesota.	THEODORE E. BURTON, of Ohio.
JACOB H. GALLINGER, of New Hampshire.	THOMAS S. MARTIN, of Virginia.
BOIES PENROSE, of Pennsylvania.	WILLIAM J. STONE, of Missouri.
CHAUNCEY M. DEPEW, of New York	F. M. SIMMONS, of North Carolina.
GEORGE C. PERKINS, of California.	JAMES P. CLARKE, of Arkansas.
SAMUEL H. PILES, of Washington.	FRANCIS G. NEWLANDS, of Nevada.
WILLIAM ALDEN SMITH, of Michigan.	JOHN H BANKHEAD, of Alabama.

WOODBURY PULSIFER, *Clerk.*
FREDERICK B. SANDS, *Assistant Clerk.*

WASHINGTON
GOVERNMENT PRINTING OFFICE
1910

communication. Why to-day most all the ocean-steamer messages are transferred or relayed from ship to ship within a radius of 500 miles at most.

I think, gentlemen, I have shown that there are strong reasons why this bill should be contrary to the best interests of the United States as a world power. All this interference complained of by the navy operators was due to the commercial companies, not to amateurs.

Sixth. We feel that the greatest objection against this bill is that if it is passed it will stifle the ambition and great inventive genius of American boys. We boys of to-day are the citizens of to-morrow. We have, many of us, already chosen wireless as our line of work. There are vast possibilities, great discoveries, and marvelous inventions yet to be revealed in the study of radio communication. We boys want a try at the great rewards that are sure to come to the successful experimenter and inventor in these lines. Wireless is not mere play for us boys, as some seem to think. We love the work, hence the name amateur, but it is always the amateur or lover of a line of work who produces results.

A few years ago only a very few boys were studying wireless. To-day there are between 25,000 and 40,000 in the United States alone. As I said, it is not mere play for them. It makes them thoughtful, observant, and trains them in the laws of cause and effect, and is, in short, an education and discipline for them.

Believe me, they are all keenly interested in the attitude of our Government toward wireless, and they expect fair play

Gentlemen, this Government is on record as a protective Government. You protect our cotton factories, our steel-rail mills, and our tobacco growers. Why not at the same time protect our amateur inventors? The returns to the Government from such protection will surely equal or exceed those from the protection given to the wool-growers of the land.

Article I, Section VIII, clause S, of the Constitution of the United States says that Congress shall have power "to promote the progress of science and useful arts," etc With this power, gentlemen, goes the responsibility for promoting the progress of science and useful arts, and wireless is bound to be one of the greatest.

The people who are to-day using and paying to the great "communication trust" unreasonable toll for the use of wires will then have only to buy a wireless instrument for a few dollars and then will be able to talk to their friends with little cost. Most every State in the Union has done away with "tollgates" on land. Does our Government now propose to pass an act to establish tollgates in the air? Soon the paths to heaven will be beset by tollgates.

The men and women of the United States will be able to typewrite a message and have a duplicate made of it at the same time in the Morse code on chemically prepared paper, which can be placed in a clock mechanism and be sent out and received by the desired person on his own special wave lengths. He or she also will be able to communicate within a radius of 400 miles by wireless telephony. We boys ask only for a chance to work these things out. Do not hamper us. I have wireless applications in our Patent Office for small patents which have been granted. I hope some day to discover something that will be a great use to the world and to my own personal benefit.

I have a telephone plant which will operate within a radius of 50

STATEMENT OF MR. W. E. D. STOKES, JR., REPRESENTING THE JUNIOR WIRELESS TELEGRAPH CLUB OF AMERICA.

Mr STOKES. Mr. Chairman and honorable members of the Committee on Commerce of the Senate, we appear before you as delegated representatives of the Junior Wireless Club of America (Limited), an organization of boys who have devoted much earnest study to radio-communication and who have already contributed to the development of this science with the firm belief that they still have more to contribute and who want the help and protection of your honorable body.

As president of this club, I wish to register with you our opinion of the bill now in your committee, known as No. 7243, introduced by Senator Depew, of New York, for the purpose of regulating wireless communication.

We agree as to the importance of licensing all professional; as well as amateur, wireless operators, but only upon the basis of a merely nominal fee of 50 cents or $1. We also believe that such a license should be revoked forthwith for malpractice at any time, such as in case of war or intentional interference in important messages, and the sending out of false calls for aid, or refusal to answer calls for aid, or to send along such messages.

We would even go further than does this bill in regard to the qualifications necessary for securing a license. For instance, we believe that every person who takes out a license should be either a born citizen of the United States, or should declare himself to be a citizen, and he must understand the Morse code—for many, especially the ocean-going steamer operators, understand only the continental code, and must agree to obey all government regulations.

Every licensed amateur operator must promise to forward government messages when requested so to do, and to state every year what kind of apparatus he has in use, the wave length he uses, and any other information deemed necessary, and the Government should issue with the license its regulations and instructions, how and what the operator is to do in case he receives a call for aid on matters important to the Government.

However, we feel there is more in this bill which arouses our protest than there is which meets with our approval.

We protest against the bill for these reasons:

First. We believe that in actual practice the provisions of this bill would discriminate heavily against the amateur and in favor of the commercial wireless companies, which are for the most part only stock-jobbing corporations and members of a great trust.

Second. It is impossible and impracticable in some of its features.

Third. It is ambiguous and capable of interpretation unfair to amateurs and students of wireless.

Fourth. It is unjust to a large body of manufacturers.

Fifth. It is contrary to the best interests of the United States as a nation.

Sixth. If passed, it will stifle the ambition and really great inventive genius of American boys.

Seventh. Should proposed Senate bill No. 7243 or House bill No. 23495 become a law, it would require, to enforce it, a force of at least 1,000 to 5,000 expert wireless engineers, whose salaries would not be less than $200 a month each, with a system of double stations in each locality to get triangulation, scattered all over the United

just as easy to conceal the aerial as it is to conceal the operator. With the new methods of radio transmission, the location of the operator could be absolutely concealed. There would be no noise, no spark to indicate his location. He might have a dozen aerials, a mile apart, which would only cost from $2 to $5 each, connected to some one locality, or a dozen localities, where the operator could be concealed, and while the engineers were trying to locate one apparatus by triangulation the offender could be operating another one a mile away, or 2 miles away. And it would require the cooperation of several skilled radio engineers to locate each apparatus.

To substantiate this statement, any of us would guarantee to prove that it will take at least a month for the government aerial engineer detectives to discover our locality, for the engineering calculations would be so intricate it would take days to locate the exact position of the offender.

Is our Government prepared to establish a detective bureau of wireless police, which will be fully as expensive, if not more expensive, to carry on as the United States customs-house?

We desire to file with your honorable committee copies of this our argument against this bill; also a copy of circular issued by P. S. Kullman & Co., stock jobbers in wireless stocks; also an analysis of the financial condition of the United Wireless Company made by the Financial Review.

We thank you for permitting us to appear before you

The CHAIRMAN. Whom do you represent?

Mr. STOKES. The Junior Wireless Telegraph Club of America.

The CHAIRMAN. Where is it located—in New York?

Mr STOKES. Yes, sir. I will present Mr. Eltz.

STATEMENT OF MR. GEORGE ELTZ.

The CHAIRMAN. Whom do you represent, sir?

Mr. ELTZ. I represent the Junior Wireless Clubs and Engineers of America.

Gentlemen, I may add a word to this interference with which we are charged. There is a lot of interference caused by the amateurs in New York City. It is not intentional, however, in any way We all have instruments, and whenever a commercial station or the navy or any big station in the city requests us to keep off, we do so, but there is a lot of interference because the naval stations and the other stations can receive greater distances than the amateurs, and an amateur coming on at night goes up to his instrument and listens and hears nobody working. It may be the navy-yard has told everybody to be quiet; so he starts to operate; he breaks up the navy-yard and the navy-yard says he interferes. It is entirely unintentional, and if the apparatus of the navy was up to date, as some of the Fessenden apparatus is, there would be no such interference. I think the bill is entirely unnecessary.

The CHAIRMAN. How many more desire to be heard against the bill?

Mr BOTTOMLY I would like to say a few words.

Senator PENROSE. Shall we sit for an hour longer, or meet again? I am only asking for information. I am going to the Senate to report a bill

Reproductions from the Congressional Record of 1910, showing parts of the statements made by Weddy Stokes and George Eltz at the hearing before the Committee of Commerce on the Depew Bill in Washington, April 28th, 1910.

Subsequently, a committee was appointed to go to Washington and plead the cause of the amateur before Congress. This committee consisting of Messrs. W. E. D. Stokes, Jr., chairman, Frank King, George Eltz, and Ernest Amy, appeared before the Committee of Commerce of the Senate in Washington on April 28th, 1910, as is evidenced by the accompanying reproduction from the Congressional Record, and through their efforts succeeded in killing the bill. The importance of their work cannot be stressed too greatly, because without this timely intervention by a handful of mere boys, who are to be most highly commended for their indominatable spirit, the amateur would certainly have ceased to exist right then and there.

RK, THURSDAY, APRIL 28, 1910

BOY WARS ON THE AIR TRUST

"Buster" Stokes, 14 Years Old, Talks to Senate Committee.

WIRELESS CHAMPION

Bill to Curb Amateurs Is Earnestly Denounced by Him.

(From a Staff Correspondent.)

WASHINGTON, April 28.—W. E. D. Stokes, Jr., fourteen years old, of New York City, and known to his friends as "Buster," appeared before the Senate committee on commerce to-day and made a plea for the amateur wireless telegraphers of the country.

The committee was considering the bill providing for regulations of wireless communication when the youthful advocate spoke. He said that he was president of the Junior Wireless Club of America, and represented 60,000 American boys. After young Stokes's plea, Frank King and Ernest Amy, two other boys representing the same club, addressed the committee.

There was much amusement when Senator Frye presented young Stokes. He stands about four feet five, wears short trousers, and does not assume to be more than the boy he is. He rushed into his argument in great seriousness, and told the committee in the language of a practiced attorney that the provisions of the bill were "not feasible but will discriminate heavily again t the amateur and in favor of the commercial wireless companies, which are for the most part stock-jobbing corporations and members of a great trust.

"The bill," he went on, "is ambiguous and capable of interpretation unfair to amateurs and students of wireless. It is unjust to a large body of manufacturers, it is contrary to the best interests of the United States as a nation, and it will stifle ambition of the really great inventive genius of American boys."

Young Stokes declared the bill would "compel the public to pay toll to the Western Union trust for all wireless messages, whereas, if we amateurs are left undisturbed and allowed to experiment we are sure that within ten years at little or no cost every one in the land will be able to communicate with any person he desires to reach within a limited radius. For instance, within ten years, a man in his automobile meeting with an accident twenty-five miles from home will be able to signal on a specific wave length, call up his own home by ring a bell there, bring his butler to the telephone and tell him the cau his delay, and that he will not be home for dinner."

The other youths who appeared declared that the Western Union Telegraph Company was absorbing all the other companies. "Soon some vast trust will be organized to corner the very air we breathe," spoke one of the associates of President Stokes.

Other advocates and opponents of the bill appeared before the committee. Commissioner of Navigation E. T. Chamberlain urged the committee to report the measure favorably, saying that the army, the navy, the treasury, and the agriculture departments should be protected by regulating the use of the air.

Joseph H. Hayden and F. W. H. Clay of Pittsburg, representing the National Electric Signal Company, took exception to the provisions of the bill, which give the army and navy priority in the use of the air. They contended that new and improved instruments would effect the very thing the bill proposed to regulate, and that the legislation was wholly unnecessary. Representatives of the Marconi and United Wireless companies were also present, and urged practically the same objections offered by the signal concern.

What the papers had to say about the trip to Washington.

By 1911 the interest in amateur radio was beginning to grow by leaps and bounds and while the original membership of the club consisted of some five active members, by this time it had more than doubled. These young boys were the leaders of amateur Radio in and around New York City at that time, and soon drew all the live operators into the organization. Due to this increase in membership it was decided on April 22nd, 1911, to hold all subsequent meetings at 326 West 107th Street, N. Y. C., the home of Frank King. It was there at a special meeting on October 21st, 1911, that it was unanimously decided to

October 21, 1911.
Special meeting.

The meeting was called at 3.00 P.M. Mr Eltz presiding in the absence of the president.

The purpose of the meeting was to elect the officers of the Club. The following officers were duly elected:—

President — Mr Frank King
Vice President — Mr George Eltz
Corresponding Secretary — Mr. George Burghard
Treasurer — Mr Ernest Amy

Old Business.

After all the suggestions of the members had been duly considered, it was decided upon that the name of the Club be changed from "The Junior Wireless Club of America" to "The Radio Club of America."

The matter of the Club pin was again brought up. A motion was made, seconded and passed, that Mr Butler, who had been doing some designing of late, should look over the suggestions of the members, and make his report as to the best design, at the next regular meeting.

Two dollars was appropriated, in order to buy postals for the use of the corresponding Secretary.

The meeting was adjourned at 4.00 P.M.

G.E. Burghard.

November 4, 1911

The first regular meeting of the Radio Club of America was held at 326 West 107th St at 3.00 P.M. Mr King presided

Old Business

A motion was made, seconded and passed that, on account of the absence of Mr Butler, the matter of the Club pin, be postponed until the next meeting.

The matter of imposing fines for absence from the meetings was again brought up. It was decided upon that henceforth this rule be strictly enforced.

New Business

A motion was made, seconded, and passed that the annual dues of the Club be raised from 25¢ to 50¢.

In order to increase the membership it was noted that J.V.; A.D.; P.M.; O.M.; G.H.; V.M.; and J.F. be asked to join the club.

A motion was made that the Club have stationary printed. This motion was duly seconded and passed. Mr Eltz was appointed a committee of one to attend to this business.

J.G. and R.S. were noted members of the Club.

The meeting was adjourned at 4.00 P.M.

G.E. Burghard

Facsimile of the original minutes of the Radio Club of America, Inc., 1911.
This was the special meeting of the Junior Wireless Club held at Frank King's house on Oct. 21st, 1911, at which the name was changed to Radio Club of America, and is followed by the first regular meeting of the Club held at the same place on November 4th, 1911.

change the name from JUNIOR WIRELESS CLUB LIMITED to THE RADIO CLUB OF AMERICA. This was in fact the birth of The Radio Club of America and a list of the members at that time, who are the original Charter members, follows:

W. E. D. STOKES, JR.
GEORGE ELTZ, JR.,
W. FAITOUTE MUNN,
FRANK KING,
FREDERICK SEYMOUR,
HARLOWE HARDINGE,
E. V. AMY,
GRAHAM LOWE,
MAX BAMBERGER,
EDWIN N. RHODES,
FRANK WHITEHOUSE,
L. S. SHAW,
GEORGE E. BURGHARD.

The following officers, who are the first officers of The Radio Club of America, were also elected at this meeting.

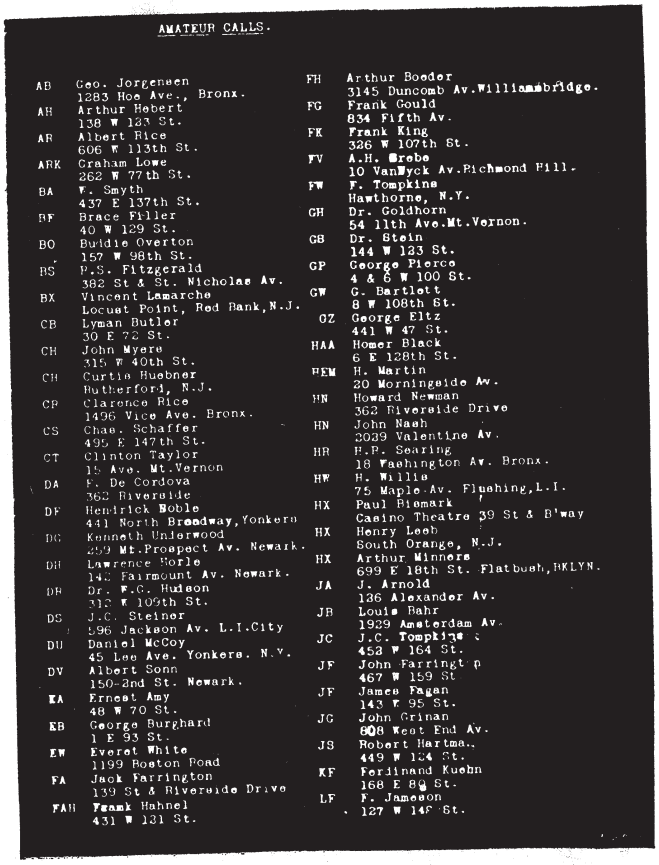
President—FRANK KING.
Vice-President—GEORGE ELTZ, JR.
Corrs. Secretary—GEORGE BURGHARD.
Treasurer—ERNEST AMY.

These are the events which led up to the beginning of the present RADIO CLUB OF AMERICA, and its first regular meeting was held at Frank King's House 326 West 107th St., N. Y. C., on November 4th, 1911.

By the end of 1911 the membership had increased considerably and the first typewritten membership list was issued, on which appeared the following names:

MEMBERS OF THE RADIO CLUB OF AMERICA

EA	Ernest Amy, 48 W. 70th St.
EB	George Burghard, 1 E. 93rd St.
GZ	George Eltz, 441 W. 47th St.
GX	Harlowe Hardinge, 410 Riverside Drive
FK	Frank King, 326 W. 107th St.
CB	L. C. Butler, 30 E. 72nd St.
	Faitoute Munn, 518 Main St., East Orange, N. J.
	Frederick Seymour, 55 Prospect St., East Orange, N. J.
X	W. E. D. Stokes, Jr., The Ansonia, N. Y.
	Edwin N. Rhodes, West Point, N. Y.
SA	Graham Lowe, 262 W. 77th St.
RS	L. Spangenberg, 406 E. 18th St., Paterson, N. J.
DR	Dr. Hudson, 312 W. 109th St.
JG	John Grinan, 808 West End Ave.
JF	James Fagan, 143 W. 95th St.
ABC	Louis Gerard Pacent, 218 Young St., Blissville, L. I.
SF	W. F. Ruth, 125 Newton Ave., Astoria, L. I.
WA	Randolph Runyon, 37 Locust Ave., Yonkers, N. Y.
BG	Daniel McCoy, 45 Lee Ave., Yonkers, N. Y.
VN	Irving Vermilya, 24 Chester St., Mount Vernon, N. Y.
MP	B. Doland, Midland Park, N. J.
FY	Fred Young, 416 Grand Ave., L. I. C.
	J. A. Fried, 525 Lockewood St., Astoria, L. I.
AM	William R. Helme, 454 Lockwood St., L. I. C.
	Frank Whitehouse, 227 W. 71st St.



AMATEUR CALLS.

AB Geo. Jorgensen
1283 Hoe Ave., Bronx.

AH Arthur Hebert
138 W 123 St.

AR Albert Rice
606 W 113th St.

ARK Graham Lowe
262 W 77th St.

BA W. Smyth
437 E 137th St.

BF Brace Filler
40 W 129 St.

BO Buddie Overton
157 W 98th St.

BS P.S. Fitzgerald
382 St & St. Nicholas Av.

BX Vincent Lamarche
Locust Point, Red Bank, N.J.

CB Lyman Butler
30 E 72 St.

CH John Myers
316 W 40th St.

CH Curtis Huebner
Rutherford, N.J.

CP Clarence Rice
1496 Vice Ave. Bronx.

CS Chas. Schaffer
495 E 147th St.

CT Clinton Taylor
15 Ave. Mt.Vernon

DA F. De Cordova
362 Riverside

DF Hendrick Noble
441 North Broadway, Yonkers

DG Kenneth Underwood
299 Mt.Prospect Av. Newark.

DH Lawrence Horle
142 Fairmount Av. Newark.

DH Dr. F.C. Hulson
312 W 109th St.

DS J.C. Steiner
596 Jackson Av. L.I.City

DU Daniel McCoy
45 Lee Ave. Yonkers. N.Y.

DV Albert Sonn
150-2nd St. Newark.

EA Ernest Amy
48 W 70 St.

EB George Burghard
1 E 93 St.

EW Everet White
1199 Boston Road

FA Jack Farrington
139 St & Riverside Drive

FAH Frank Hahnel
431 W 131 St.

FH Arthur Boeder
3145 Duncomb Av. Williamsbridge.

FG Frank Gould
834 Fifth Av.

FK Frank King
326 W 107th St.

FV A.H. Grebe
10 VanWyck Av. Richmond Hill.

FW F. Tompkins
Hawthorne, N.Y.

GH Dr. Goldhorn
54 11th Ave. Mt.Vernon.

GB Dr. Stein
144 W 133 St.

GP George Pierce
4 & 6 W 100 St.

GW G. Bartlett
8 W 108th St.

GZ George Eltz
441 W 47 St.

HAA Homer Black
6 E 128th St.

HEM H. Martin
20 Morningside Av.

HN Howard Newman
362 Riverside Drive

HN John Nash
2039 Valentine Av.

HR H.P. Searing
18 Washington Av. Bronx.

HW H. Wallis
75 Maple Av. Flushing, L.I.

HX Paul Blomark
Casino Theatre 39 St & B'way

HX Henry Loeb
South Orange, N.J.

HX Arthur Minners
699 E 18th St. Flatbush, BKLYN.

JA J. Arnold
136 Alexander Av.

JB Louis Bahr
1929 Amsterdam Av.

JC J.C. Tompkins
452 W 164 St.

JF John Farrington
467 W 159 St

JF James Fagan
143 W 95 St.

JG John Grinan
608 West End Av.

JS Robert Hartman
449 W 124 St.

KF Ferdinand Kuehn
168 E 84 St.

LF F. Jameson
127 W 142 St.

LS Louis Schulman
210 W 106 St.

MR W. Burbara
White Plains Rd. & 238 St.

MIS Milton I. Strauss
1449 3rd Ave (96th St)

MP J.A. Potton
Plainfield, N.J.

MS Leslie Sherwood
159 W 145 St.

NWA Fred Carlick
Montclair

NF Morris Flanner
113 W 111th St.

NXP W.H. Marshal
167 S.Cheatnut St
Plainfield, N.J.

PC Percy Corwing
5 W 107 St.

PD Howard Barrett
343 E 158 St.

PI John Allis
106 W 89 St.

PM Robert Johnson
53 Governeuer Ave
Rutherford, N.J.

PN Jacob Weiss
Port Washington, L.I.

PN Fred Gittebauer
East Rutherford, N.J.

PX P.M. Boucheron
360 E 48 St.

Q Principle
354 College Av.

QO A. Lopez
54 E 105 St.

QS Jule Keen
179 St & Wash.Av.

QT G. Show
10 W 178 St

QW C. Winslow
1989 Amsterdam Av.

QX Johnson Bros.
1026 2nd Av.

RD Clarence Pfeiffer
346 Prospect Ave.
Ridgewood, N.J.

RQ Captain Snow
Tug Merritt.

RQ Jos. Hopfenberg
442 E 86 St.

RS F. Spangenberg
406 E 18 St.
Paterson, N.J.

RSO Roy Schomp
Edgewater, N.J.

RWN Robert Munn
85 Lincoln Ave.
Ridgewood, N.J.

RX H. Trinkhaus
496 E 138 St.

SA D.A. Schoen
455 W 140 St.

SC Frank Ballard
331 W 83 St.

SF Columbus Institute
Hawthorne, N.Y.

SK Fred Skinner
Mount Vernon.

SS Crosby Sewell
21 W 126 St.

SY T.J.Styles
159 Bee St.Yonkers.

TF T. Field
Clinton Place, Newark.

TH Robert Livingston
Hackensack, N.J.

TR George Post
393 Riverside Drive

UH Ernest Hubner
1657 First Ave (86th St)

VM C. McPherson
130 W 91 St.

VN Irving Vermilya
24 Chester St.Mt Vernon.

WA Randolph Runyon
37 Locust Av.Yonkers.

WC Walter Cohen
2071 Fifth Av.

WHR Harry Conner
176 St & Audubon Av.

WI Arthur Davis
611 W 114 St.

WL Walter Lemmon
94 St & Broadway

WP Walter Pfeiffer
550 W 144 St.

WR K. Russell
240 W 104 St.

WX Donald Pieri
703 E 137 St.

WX Harold Schwab
2 W 86 St.

X W.E.D. Stokes, Jr.
The Ansonia Hotel.

XA J. Pipple
326 E 57 St.

YN C. Potter
763 Beck St. Bronx.

YX Donald Pieri
703 E 137 St.

YP Fred Parsons
764 Beck St. Bronx.

ZB Marshall Bewick
38 W 129 St.

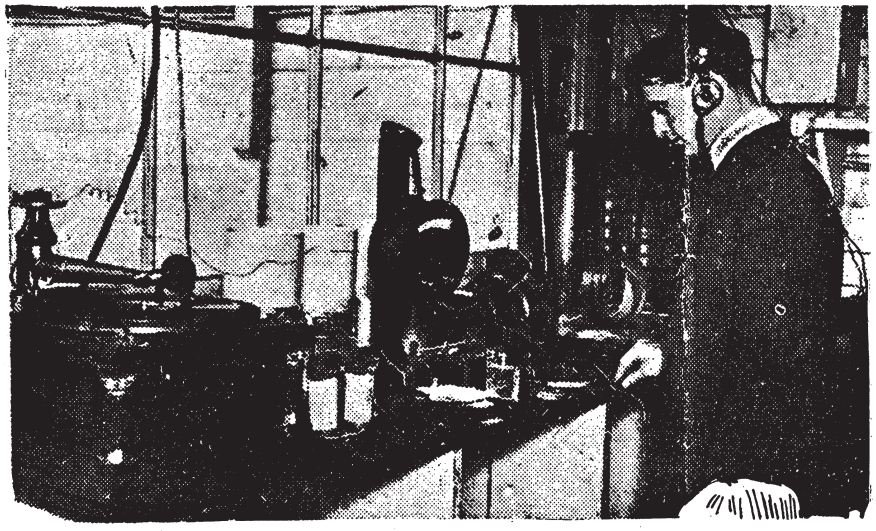
The first amateur radio call book 1912.

The number of amateur operators was increasing daily now, so that the club decided to be of further service to the art by issuing a call list of amateur stations. Through the painstaking efforts of the members, and particularly Frank King and Dr. Hudson, a List was compiled by contacts through the air, since this was the only means of getting calls and addresses. The list was blue-printed and sold to all operators at 10 cents a copy upon application to Frank King. This was the first amateur call book ever issued and photographs of the original appear elsewhere on these pages.

At a regular meeting on January 20th, 1912, the club emblem and a club pin designed by Frank King, were unanimously accepted. The pin as illustrated below, was gold on a black background.

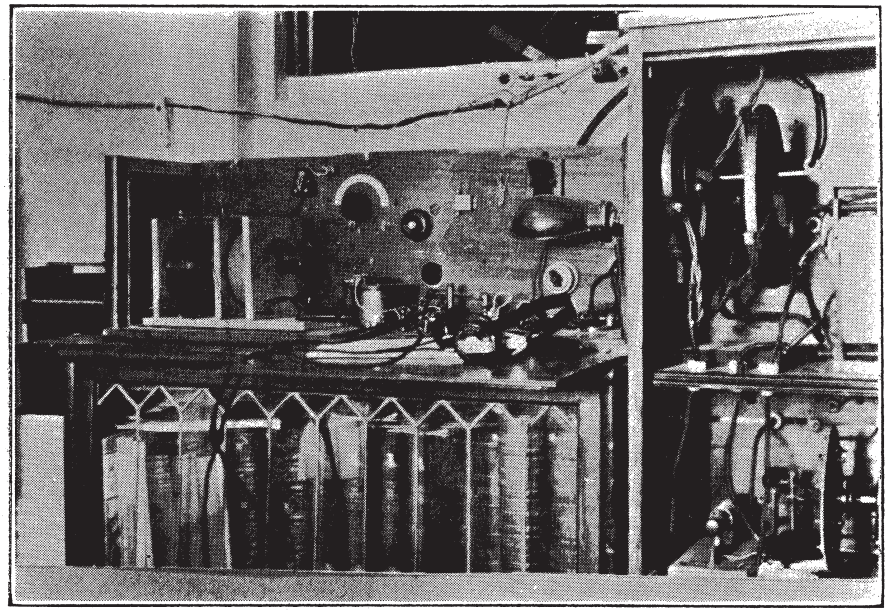
In 1912 the Alexander Wireless Bill was introduced in another attempt to stifle the amateur. This bill purported to do everything that the Depew Bill had failed to accomplish and even more. The Club again took immediate action, killed the bill in committee, and in later years, through the concerted action of its members in the U. S. service after the Armistice, definitely settled the matter.

By this time books and other literature on various radio topics began to appear, so that the knowledge of the Club members was greatly increased and papers were delivered at their monthly meetings, which were held at the home of Frank King, who was elected first President of the New organization. The first papers consisted of short talks describing the various stations operated by the members, and various they were indeed. It is almost useless to attempt descriptions, but perhaps the accompanying photographs will serve to give an idea of the types of apparatus used and the great handicap under which communication was maintained in those days when it was considered a great event to work Yonkers from New York City direct But still, even this was a great advance over the



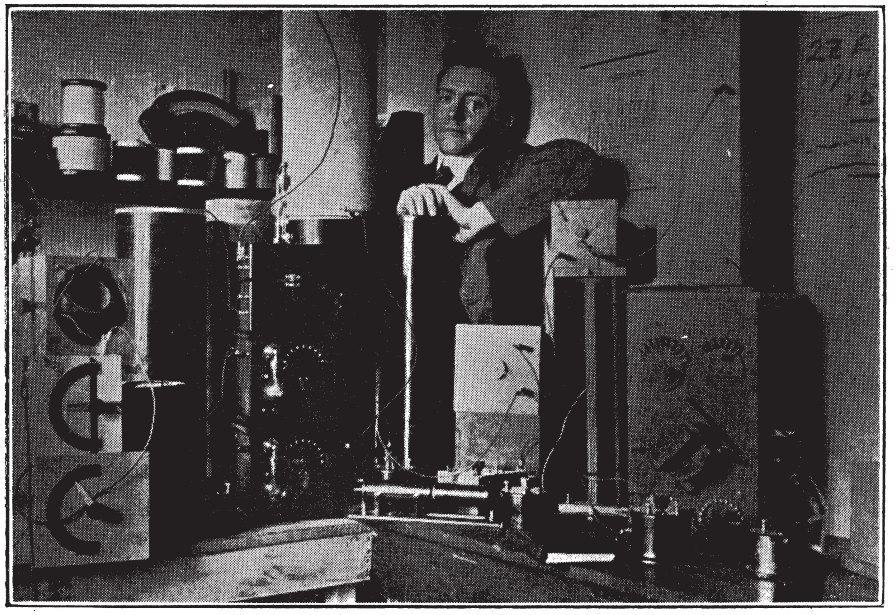
George Eltz at arc radio telephone station "FK", Frank King's house, 326 W. 107th St., 1912. This was probably the first radio broadcasting station on record. Note the phonograph for producing "canned" music.

old coherer days. Now there were crystal detectors, microphone detectors, and even electrolytic detectors. Boys were busily engaged in breaking up chunks of rock in an attempt to find a good piece of carborundum, copper pyrites, or zincite, or groveling on hands and knees diligently searching the floor for the missing



Dave Brown's station, New York City, 1914.
This shows a considerable advance in design over the old days. We now have pancake tuning inductances loose coupled, and rotary spark gaps.

piece of Wollaston wire which was always diminutive and hard to find. These new detectors together with the advance in knowledge enabled the amateur operator to establish quite reliable communication within the city limits and occasionally



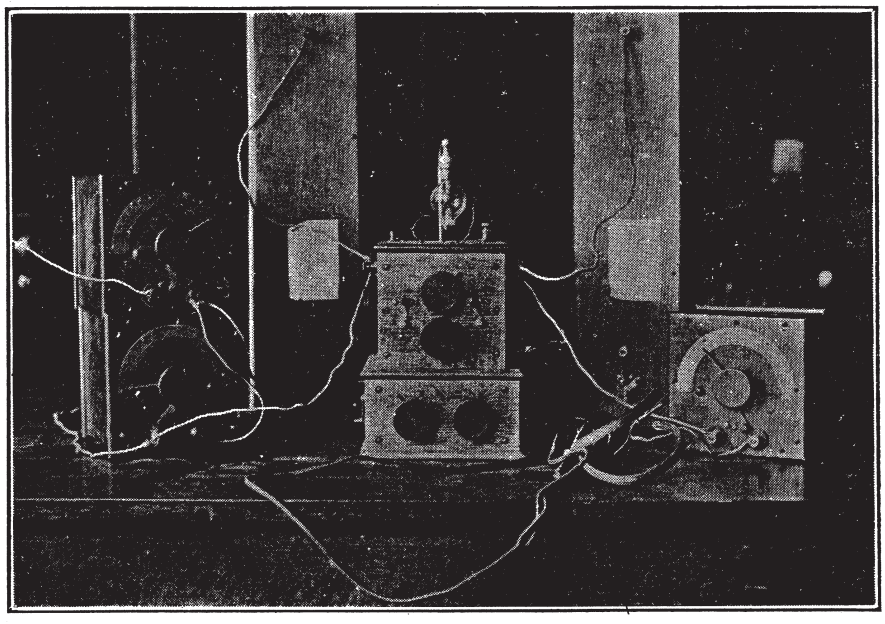
Paul Godley station 2ZE, Montclair, N. J., 1914.
Typical of the Audion and regenerative circuit period. Note the variometer and miles of tuning inductances.

a superhuman feat such as working Yonkers, a distance of about fifteen miles was accomplished, but for some unknown reason it was impossible to get any signal across to Brooklyn.

And yet the strivings of this handful of boys led to great things and great things were discussed at the meetings. No one thought of the far-reaching possibilities of the Hudson coated filament at the time when Dr. Hudson delivered his paper describing this very useful invention over the pool table at Frank King's house in 1913, nor were the stupendous results of the regenerative circuit in any way apparent at the time E. H. Armstrong told us all about it at one of the meetings in 1915. Who could have dreamed of the extent to which radio telephony would grow when, in 1911, George Eltz and Frank King constructed and operated an arc telephone transmitter at 107th Street and actually played music for the benefit of the fleet in the Hudson River when the alcohol didn't explode in the arc chamber and cause a violent break-down without any time for an apologetic "one moment, please." This may be said to constitute the first real broadcasting station ever operated with any degree of success.

Equally prophetic, was the disclosure of the Square Law Condenser before the club, by George Eltz in 1913, for the first time in history; since this very instrument was later to become a most important part of all radio frequency measuring apparatus.

The serious nature of the organization thus evidenced, soon attracted the attention of the early radio workers, so that aside from papers prepared by its own members, the Radio Club was soon honored by addresses by such well known radio men as: R. H. Marriott, Dr. A. N. Goldsmith, J. V. L. Hogan, F. Lowenstein, Dr. J. Zenneck, F. Conrad, W. C. White and others, all of whom subsequently became members.

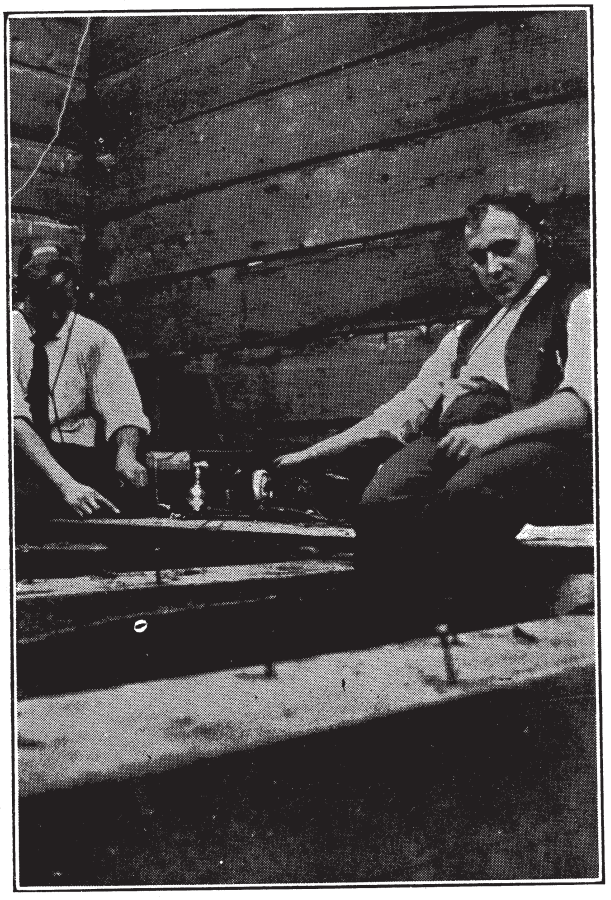


Original apparatus with which E. H. Armstrong discovered the regenerative circuit in 1912.

By this time the three-electrode vacuum tube had appeared on the scene. Audions they were called, and cost $5.00 a piece, but every amateur had to have one. So down to the Metropolitan Tower he would go, up to the DeForest Radio Company's laboratory, leave his five and go home with his most precious possession. Of course the number of identical new circuits and inventions developed by these

boys was great, but nevertheless communication was greatly benefited and messages could be sent and received over distances of approximately 50 miles, quite regularly. This marked a great advance in amateur radio.

In 1912, one of the most illustrious members of the Radio Club, E. H. Armstrong, developed the feed-back circuit which has made possible the broadcasting of today. This, of course, did wonders for the amateur. All kinds of tuning coils and couplers were put into use, and sets were operated to the Nth degree of regeneration until finally real communication with the Western amateur stations was established and amateur radio came into its own.



Harry Sadenwater and Louis Pacent listening for trans-Atlantic signals under the Palisades, N. Y., 1914. The angelic expression was probably due to atmospherics.

This also opened another field to the amateur, namely trans-Atlantic reception. Perhaps the first attempts at hearing the stations of Europe were made by Paul Godley, Harry Sadenwater, and Louis Pacent, who in 1914 strung an antenna from the Palisades on the Hudson River and with a specially constructed receiver listened patiently for what they had never heard before. Little did Godley think at that time that some years later he would be listening just as attentively, under different conditions, in a tent in Scotland for the signals of his brother amateurs in America.

In those days, of course, there were no licenses and no regulations for amateurs. Everyone used whatever wavelength he happened to hit upon, and the great difficulty of getting a wave meter left that unknown in most cases. The

only way to find out whether the set was in tune was by inserting a carbon filament lamp in series with the antenna and adjusting the helix (antenna tuning inductance) for maximum brilliancy. Some stations had aerials of as many as eight or ten wires, one to two hundred feet long, and spark gaps directly coupled. This, of course, could not continue, so the Radio Club welcomed the new license regulations and did a great deal toward assisting Radio Inspector Marriott and later Harry Sadenwater in cleaning up the mess. In fact, the relationship of the Club with the Department of Commerce has always been most friendly. On one occasion the two organizations combined to track down an amateur station in Brooklyn with a loop mounted on an automobile. The boy had for no apparent reason been sending out distress calls, and after a whole night's searching the station was finally located and the culprit called to account.

This was going a long way toward the right system of cooperation, especially in those days when the notion of free air still prevailed and it was actually necessary for the operators of one commercial station to invite certain amateurs to go swimming at Coney Island so that the relief operators could handle their traffic without interference!

The WORLD'S ADVANCE

Vol. 31 JULY, 1915 No. 1

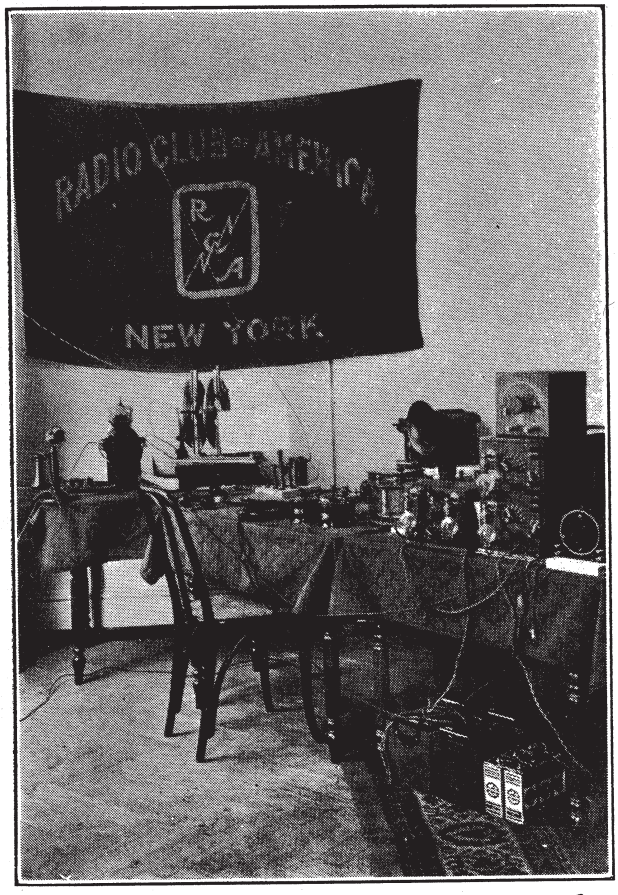
TIME was when the wireless operator was considered a nuisance. In the old days he caused more than one commercial and Government operator to employ profane language in voicing his opinion of some one particular amateur, and all of them in general, especially when endeavoring to read a long distance message with a nearby amateur indulging in a friendly conversation with another amateur, or, worse still, holding down his key in order to adjust the spark gap. Conditions are entirely different today The amateurs, thanks largely to the Government regulations now enforced, have developed into serious experimenters, with their hobby and the interests of others at heart. On more than one recent occasion the amateurs have come to the rescue of Government and commercial wireless operators when both the latter required assistance. A most typical instance of this fraternal co-operation was witnessed a few weeks ago during the visit of the Atlantic Squadron to New York City. The Radio Club of America installed a model radio station in the Hotel Ansonia, the headquarters of Admiral Fletcher and his officers, enabling the visiting Admiral and his staff to communicate with the vessels of the fleet. But the installation of the apparatus did not complete the commendable undertaking. Club members operated the instruments during the entire period of the naval visit and handled no little amount of wireless traffic for the naval officers The station proved a great convenience to Admiral Fletcher and his officers, and this deed on the part of the Radio Club of America will no doubt serve to bind still closer the tie of friendship between the amateurs and the Government and commercial operators.

The press comments on the Club station at the Ansonia in 1915.

The Club soon outgrew its quarters at Frank King's home in 107th Street and it was not long before the attendance at meetings grew so large that it became necessary to use the large lecture halls of Columbia University for the monthly gatherings. As the art grew and radio knowledge was more readily obtainable, the character of the papers also changed. The small body of amateur operators gradually changed to a large scientific organization of recognized standing, before which the leading lights in the radio world were glad to deliver papers on their newest discoveries. But in spite of these changes the club idea and spirit of comradeship was never lost and even today the Radio Club of America is as proud of its congenial club spirit as it is of its scientific standing.

In 1915 the Club installed and operated a transmitting and receiving station in the Hotel Ansonia where Admiral Fletcher had made his headquarters. The station operated by the Club members handled all of the Admiral's traffic with the fleet in the Hudson River. Several hundred messages were handled, and

President Wilson himself sent a message from the *Mayflower* commending the good work. The Navy League also presented the Club with a banner in recognition of its services.



Radio Club station at Hotel Ansonia, N. Y. C., operated in conjunction with the Navy League in 1915. Operated entirely by club members, this station handled all the traffic for Admiral Fletcher and his staff, while the fleet was in the Hudson in 1915.

Up to 1915 the club had been operating under the original constitution of the old Junior Wireless Club, but it soon became apparent that conditions had changed and the old By-laws had become antiquated. Consequently a new Constitution was drafted and submitted to the members with the following letter:

TO THE MEMBERSHIP OF THE RADIO CLUB OF AMERICA:

It has become quite apparent that the present Constitution of the Club, adopted in 1909, is wholly inadequate in fulfilling the present needs of the Club. The Board of Directors has therefore drafted a new Constitution which it believes allows each individual member ample participation and representation in the Club government but eliminates a large portion of the inefficient and impractable procedure which has tended to characterize much of the Club business of late.

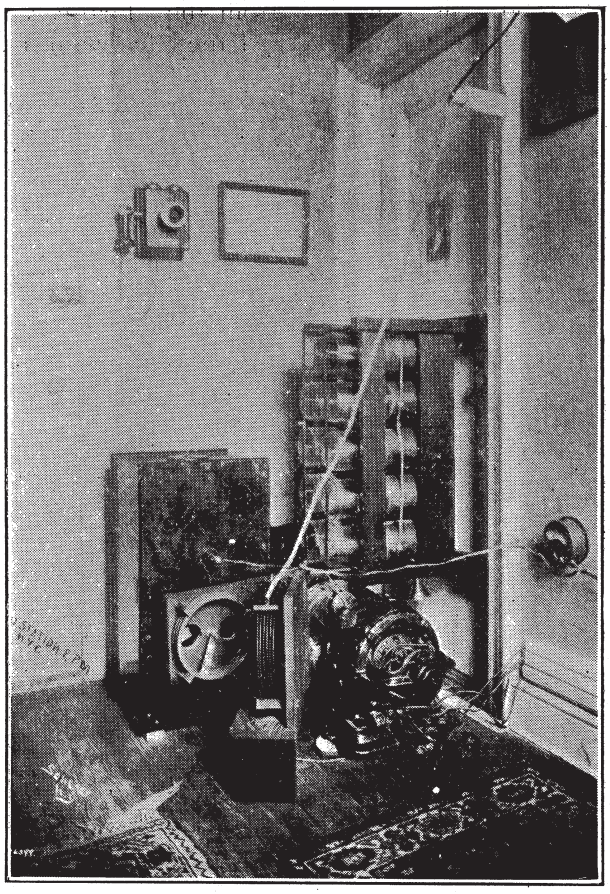
A decided increase in the amount of Annual dues was deemed necessary due to the coming expenses of securing meeting halls, publishing a year book and proceedings, and many other current disbursements which are rapidly increasing due to the extension of Club activities.

Under the present Constitution amendments may be made "at any regular meeting of the Club by a two-thirds vote of the Members present." The Board of Directors considers more expedient the submitting of the proposed Constitution to each individual Member for vote by letter ballot. It is urged that each member will fill in the attached ballot at his earliest convenience and forward it to the Corresponding Secretary.

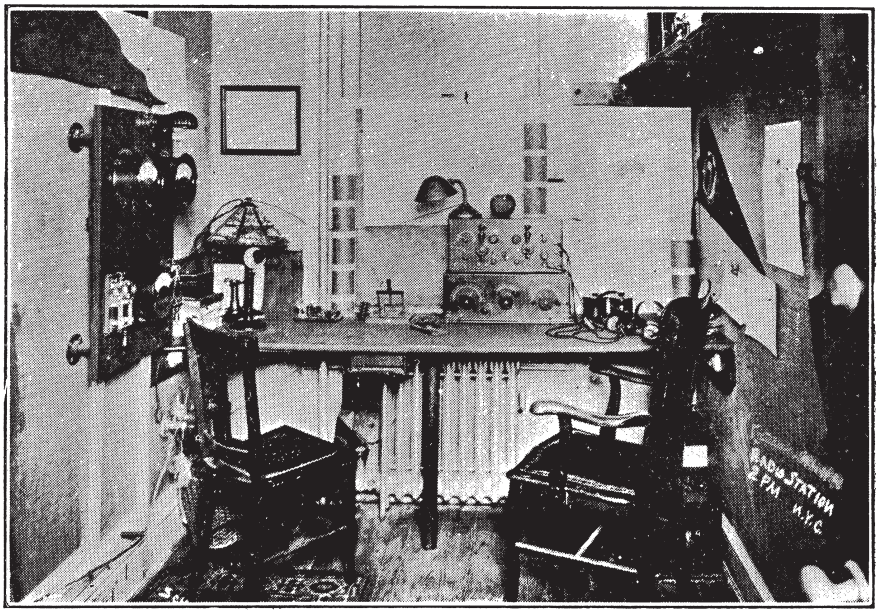
At 8 P. M., May 15, 1915, the accompanying Constitution shall be considered adopted if two-thirds of the votes received by that time are in favor of such action.

Respectfully submitted,
THE BOARD OF DIRECTORS,
GEORGE ELTZ,
L. G. PACENT,
E. V. AMY,
D. S. BROWN, Jr. (Corres. Sec.)
T. JOHNSON, Jr.,

The new constitution was duly adopted and has remained unchanged to date.



Transmitter, Station "2PM", which producted the first transcontinental signals in 1916. Note the synchronous rotary gap mounted between motor and generator, large plated Leyden jar condensers and 1 K.W. United Wireless coffin transformer. This was the very latest equipment at the time.



Record-breaking station, "2PM", John F. Grinan and Adolph Faron, 808 West End Ave., N. Y. C., 1916.

This was the most famous amateur station of its time. A short wave regenerative receiver with one stage of audio frequency amplification was used with great success.

A year later, amateur station 2PM which has gone down in history as one of the most famous of all amateur stations, owned and operated by John Grinan and Adolph Faron, succeeded in breaking all records by sending the first trans-continental relay message from New York to California. This affair was not pre-arranged but was accomplished during the ordinary transmission periods and the answer was received back in New York in one hour and forty minutes from the time of transmission. Several weeks later the same station and the same operators succeeded in getting signals to California, a distance of some 2,500 miles over-land, a feat which had heretofore been deemed impossible with an input of one kilowatt on amateur wavelengths.

This bring us up to the period of the Great War in 1917, when the activities of the club had to be suspended, due to the fact that all the members who were of age enlisted in one branch of the service or another. The following extract from the minutes of the directors' meeting of October 6th, 1917, gives an idea of the policies pursued by the club during this period.

POLICY TO BE PURSUED DURING THE WAR

Question of administration of Club's affairs during existence of extraordinary situation created by the War discussed. A letter from Director T. Johnson, Jr., at present in the service of the Radio Division at Washington and unable to attend, was read. In view of the fact that all but three of the directors (Godley, Pacent and Styles) are now doing military or naval duty, Mr. Johnson's suggestion that Mr. Styles be assigned, pro tem., the duties and powers of the officers and directors engaged in such service and therefore unable conveniently to execute them themselves, was approved. It was the sense of discussion which followed that the arrangement be further approved and ratified by the membership, the situation to be briefly explained to them on the postal card notice of the next meeting, requesting each member to be present thereat to state his approval, or if unable to attend to signify his approval in writing to the Corresponding Secretary. In view of the impossibility of carrying out to the letter the terms of the Constitution and By-Laws and of getting proper representation of membership votes under the present war conditions, it was also the opinion of the directors that, for the duration of the war, the present personnel of the Board and of the Club's officers should be retained intact, the matter also to be called to the attention of the members for their approval in the notice of the next meeting.

The following letter was then sent to the membership in an attempt to be of service in organizing the radio men of the country, and needless to say it proved very fruitful.

February 21, 1917.

To the Membership of The Radio Club of America:

The radio amateurs of the Country are a potential source of aid in the national defense. To realize these possibilties in the most effective way it is necessary that the various organizations be co-ordinated through a central body.

At this grave moment in the affairs of our nation The Radio Club of America is preparing to co-operate with the Committee now engaged in organizing the radio engineers of the country. The Board of Directors is about to submit to this Committee a classified list of the Club members, specifying the particular abilities of each. As it is desired to complete the list **immediately,** you are urgently requested to **fill out the enclosed blank form in detail** and forward it to the Corresponding Secretary **by return mail.**

It is pointed out that the filling out of this form does not involve any obligation, but is for the purpose of obtaining information regarding the qualifications of our membership for possible service in the defense of the nation.

THE BOARD OF DIRECTORS,
THOMAS J. STYLES, Corresponding Secretary.

The war records of those members who enlisted have been chronicled elsewhere, and would make too lengthy a proposition for this article. It suffices to say, that practically all were officers in Radio capacities and in charge of important operations, such as: radio aircraft, radio schools, laboratories, field service, etc. Notably, E. H. Armstrong, while with the allied forces in France, in 1918, invented the Superheterodyne receiver which was used in the intelligence service at the front, and as we all know, has since become the universal circuit for broadcast reception.

After the Armistice had been signed and things began to assume a more normal appearance, the club activities were again resumed. The first meeting of the board of directors was held at Keen's Chop House on October 13th, 1919. As a result of this meeting the following letter was sent to the membership.

October 30, 1919.

To the Membership of The Radio Club of America:

Now that the national crisis is at an end, the period of suspension of the Club's activities which became operative in the Fall of 1917 has been terminated by the Board of Directors. At a meeting of the Directors held on Oct. 16, 1919, the following important decisions with regard to our future programme were made:

(1) That a dinner be first tendered to our President, Mr. Edwin H. Armstrong, in his honor as a token of our regard and in appreciation of his splendid achievements as a Major in the Signal Corps of the Army and of the honor he has brought to The Radio Club of America.

(2) All dues prior to January 1, 1920, whether in arrears or otherwise, to be stricken from the records, dues to be payable and to date from January 1, 1920.

(3) Recommendations made to the Committee on Papers to avoid, in future, presentation of what might be termed "highly technical" papers. This Committee has in store a treat for the members in the forthcoming delivery of lectures bearing on the tremendous amount of research conducted, and the actual practical results obtained in the radio field during the War, supported by data on construction of apparatus, and, whenever possible, by exhibition of apparatus.

(4) A time to be appointed by the Chairman at each meeting to provide for informal discussions on **any** radio subjects.

Arrangements are now in progress for the resumption of our regular monthly meetings. Statements of dues will be mailed by the Treasurer, Mr. E. V. Amy, at the proper time. Further notice with respect to the next meeting of the Club will be sent you.

The following items are bulletined herein as they will undoubtedly prove of interest to many members:

National Service Committee, Engineering Council, 10th and G Sts., Washington, D. C.—This body is sending regularly to the Club bulletins which are of general interest to all engineers throughout the country. It obtains the latest information on all Government engineering activities of any character. It extends a cordial invitation to all our members to make use of its service. The Council is, in effect a coordination of all engineering efforts of the country. Such bulletins as have been received will be displayed at the next Club meeting.

U. S. Employment Service—Professional and Special Section, 16 East 42nd St., New York—Wishes to interest our members in the work it is doing in placing highly trained professional and technical employees who have been released from the Army, Navy and war work.

Engineering World, New York and Chicago—The publisher will gratuitiously devote 30 to 40 words in its want columns to each engineer who has been in the service of the country and who seeks employment. It will put a small star at beginning of each want ad, and replies must be addressed in care of the Club.

The Directors are desirous of obtaining from the members a brief record of their activities during the World War, their present addresses, etc. Will you therefore fill out and return **at once** the form below?

Respectfully,
THOMAS J. STYLES, Corresponding Secretary.

The dinner, with Major Armstrong as guest of honor, was scheduled for November 19th, as per the following announcement:

Announcement of
DINNER AND RECEPTION
To Be Tendered by the Membership of The Radio Club of America to Its President
MR. EDWIN H. ARMSTRONG
Major, Signal Corps, U. S. Army

To the Members:

The name of Edwin H. Armstrong is known, by reason of his invention of the Armstrong Regenerative Audion Circuit, not only to the members of The Radio Club of America, but in every corner of the world where radio communication is used. When the radio amateurs of the United States were confronted with the discouraging restrictions of the Act of 1912, there was apparently no alternative left to them but to abandon practice of the art. How the then existing gloom was dissipated, and how the amateur was rehabilitated by Mr. Armstrong's introduction of his circuit and his invitation to all amateurs to freely use it for their own purposes, needs no repetition.

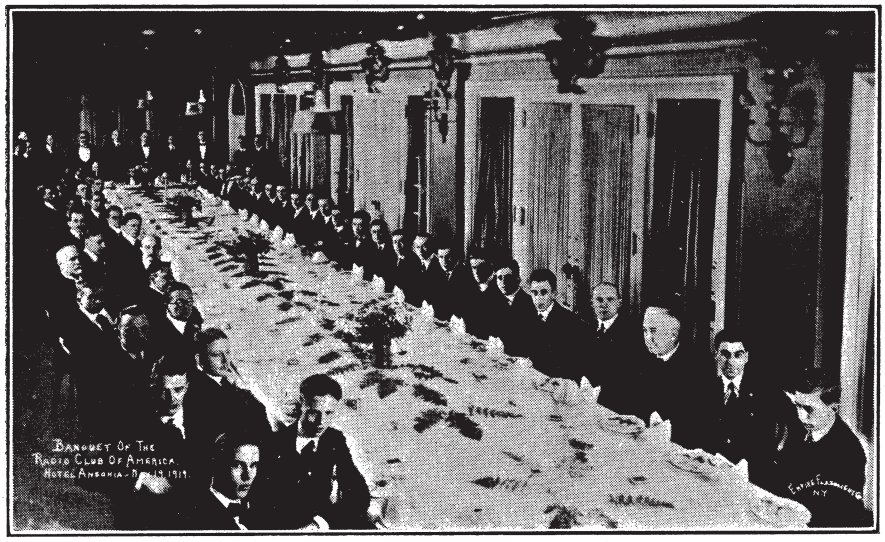
Mr. Armstrong recently returned to the United States and to civilian life after long and continued service in France with the United States Army. The opportunity is ours to show our appreciation of him as a fellow-amateur and as President of our Club—one who has rendered distinguished service to the nation, and brought honor to the Club by reason of the nature of that service, during the World War. A Committee composed of members of the Board of Directors was formed for the purpose of having the membership tender Mr. Armstrong a Dinner. The expenses will be defrayed by subscription of the membership. The cost will be approximately four dollars ($4.00) per plate. The Dinner, which will be **strictly informal** will be given at the HOTEL ANSONIA, BROADWAY and 73rd STREET, NEW YORK CITY, on WEDNESDAY EVENING, FEBRUARY 19, 1919, at seven-thirty o'clock. Tickets are four dollars ($4.00) per person.

Will you make every possible effort to insure the success of the Dinner by being present YOURSELF. Let this be an after-the-war "get together" occasion. Set everything else aside just this once, and, if you may be thinking of the cost of the ticket, consider the saving in dues which resulted from their suspension in 1918 and 1919. Bring your friends and relatives if you wish.

Please indicate how many tickets you desire by filling out and detaching the blank below, forwarding it to the Treasurer with your remittance (payable to him) **at your earliest convenience** so that the Dinner Committee may make proper reservation, using the enclosed stamped addressed envelope. Send check, money order or express order.

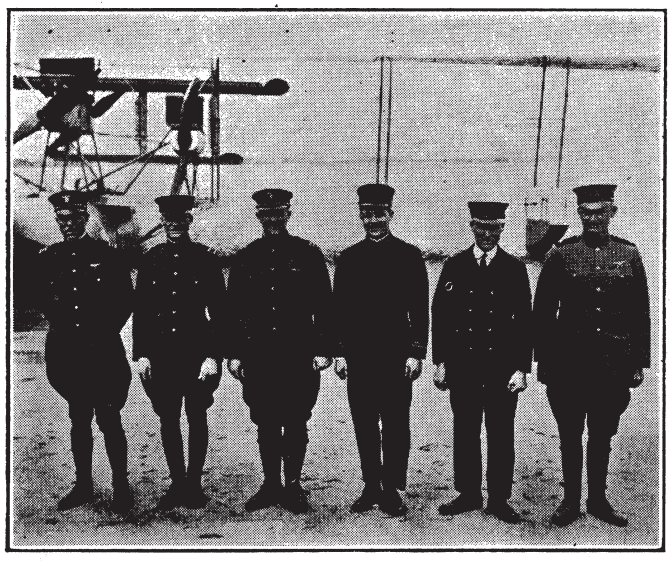
Very respectfully,
THOMAS J. STYLES, Corresponding Secretary
for the Dinner Committee.

The affair was a great success. Many prominent men were present, and due homage was paid to Armstrong for his outstanding work with the Expeditionary Forces, as well as his many other worthy achievements.



Radio Club Banquet given in honor of Howard Armstrong at Hotel Ansonia, 1919.

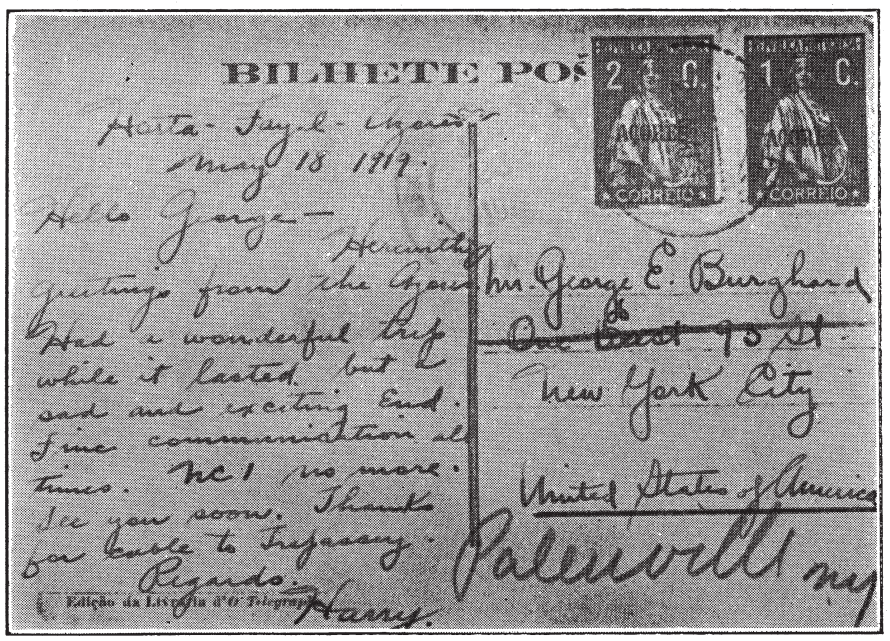
In 1919 the first successful flight across the Atlantic was made by the U. S. Navy, from Halifax to Portugal. Three planes were used and of course radio was a very important part of the equipment and the operators had to be of sterling worth. Lieutenant Harry Sadenwater, a Radio Club member, was chosen to operate the set on the NC1. Unfortunately this ship was forced to the water within twenty miles of the Azores and it was due to the valiant efforts of Lieutenant Sadenwater that the storm-tossed crew were finally rescued by a destroyer which responded to his calls after some fifteen hours of gruelling work.



Trans-Atlantic flight 1919.
Crew of the NC1, Harry Sadenwater, third from right.

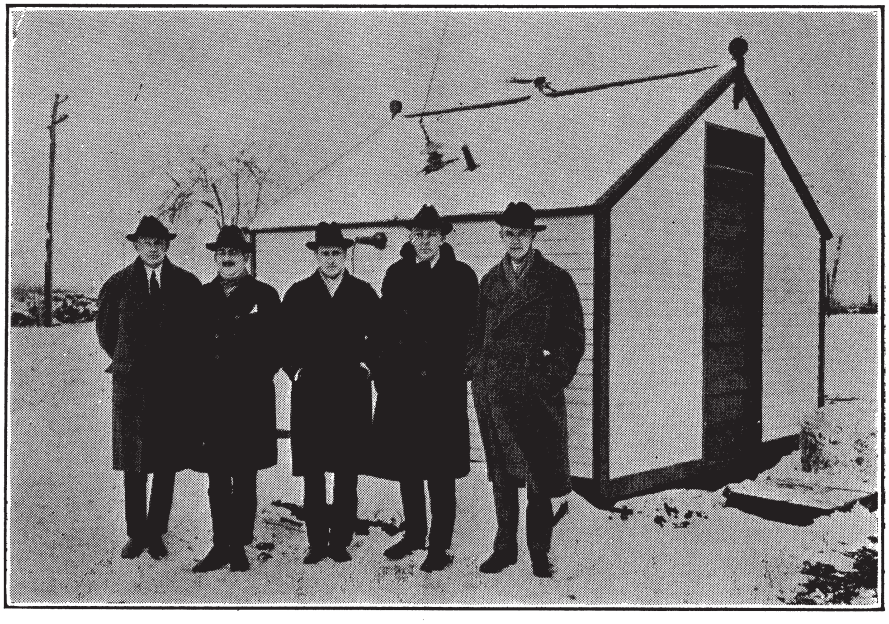
Now that all war restrictions had been lifted, the amateur came into his own once more, and bent to the work of reconstruction with a vim. Old poles and antennas were once more erected and transmitters revamped. To be sure things were not like the good old days, for the Department of Commerce regu-

lations had to be rigidly adhered to, but with new developments and experience gained during the war, amateur communication became even bigger and better. The advent of the tube transmitters opened the field of radio telephony and a good many of the erstwhile telegraph hams were already embracing this new development. Three of the club members, Ernest Amy whose call was 2VK, Harry



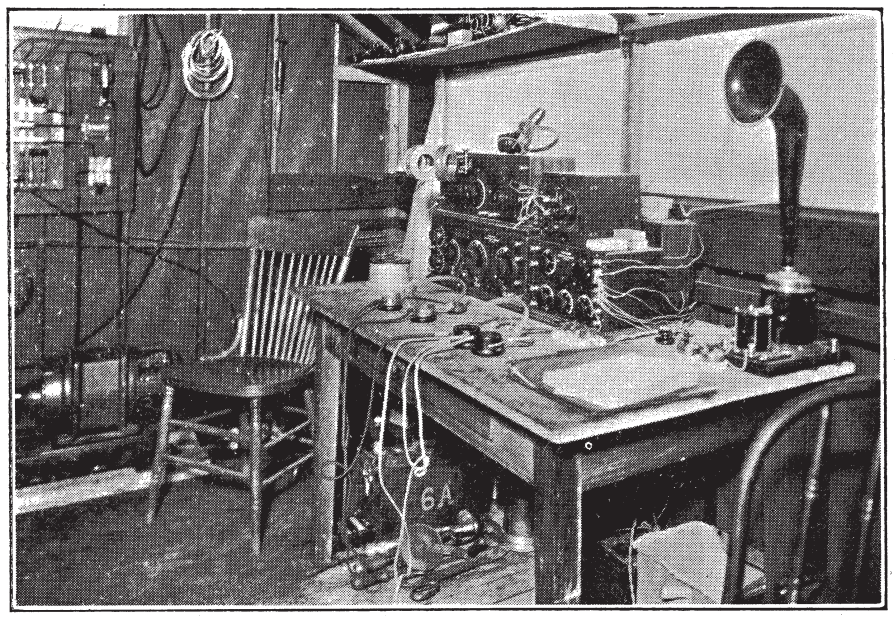
Postcard sent by "Harry" from the Azores.

Sadenwater, 2PZ, and George Burghard, 2SS, maintained very reliable telephone communication across the city using exceedingly low power on 200 meters. In fact on several occasions these stations were picked up at a distance of 50 miles. Regular musical programs were transmitted through the medium of a phonograph, and this constituted the first real amateur radio broadcasting with tubes.



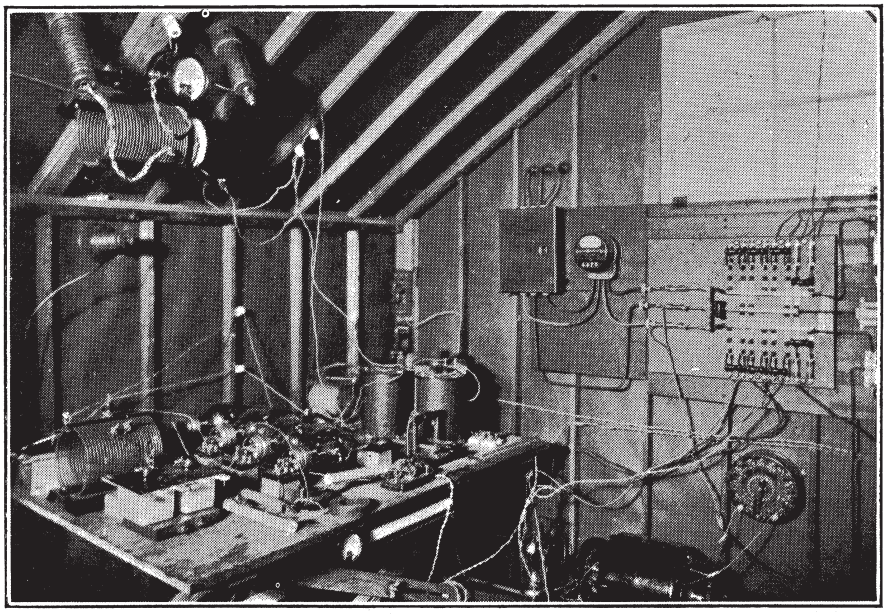
Operating staff, station "1BCG". Left to right: Amy, Grinan, Burghard, Armstrong, Cronkhite.

The idea of transmitting American amateur signals across the Atlantic originated with one of the prominent members of the Club before the world war, when Louis Pacent presented the matter for the consideration of the board of directors. Nothing definite was accomplished, however, and several later attempts



Receiver at station "1BCG", Greenwich, Conn., 1921.

were abandoned as too costly at the time. In 1921 the American Radio Relay League decided to run a transatlantic test and send a representative to England to receive the American signals. Paul Godley, one of our oldest members, was selected as the logical man to carry on the reception.

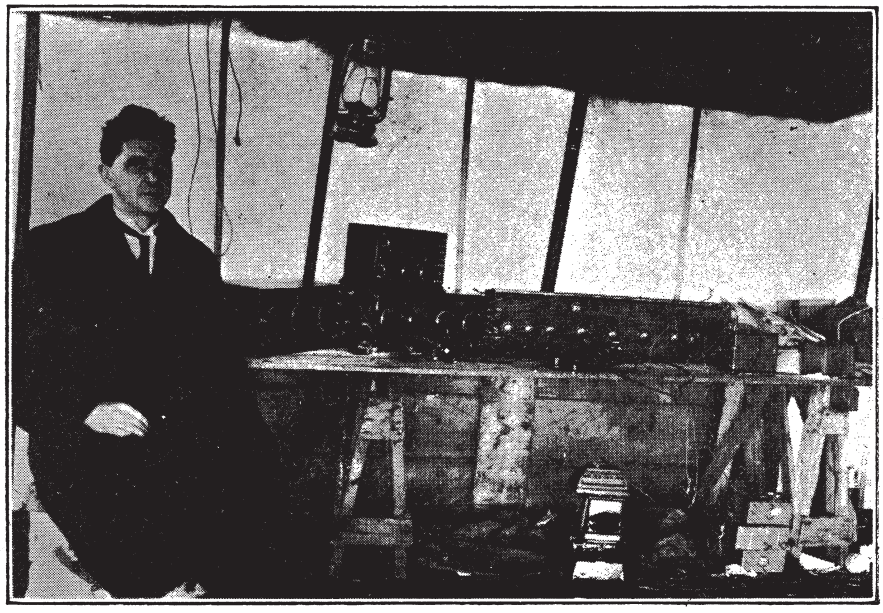


Transmitting apparatus at station "1BCG", Official Radio Club of America station, which established two World records in the amateur Transatlantic tests in 1921, by transmitting a twelve word message to Ardrossan, Scotland, and three messages to Catalina Island, Calif., direct.

On November 18th, 1921, six members of the Radio Club of America at an informal meeting, decided to build a transmitting station that would be heard in Europe. The six men were: E. H. Armstrong, Walker Inman, E. V. Amy, John Grinan, Minton Cronkhite, and George Burghard. Much discussion as to the locations of the station followed, but it was finally decided to build at Greenwich, Conn., on the site of Cronkhite's present station 1BCG.

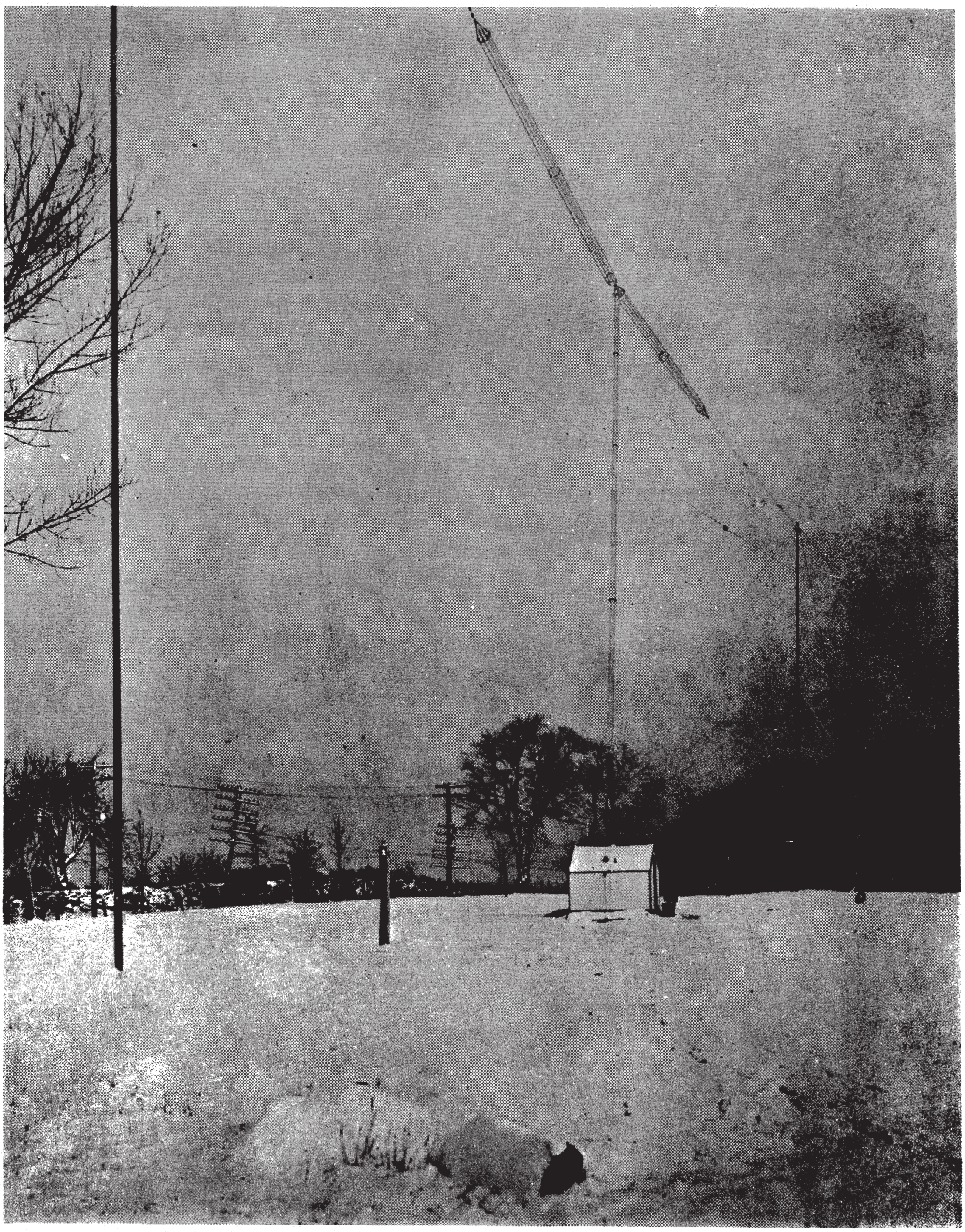
The construction of the station and all technical data has been recorded elsewhere, and a description would be too lengthy for this article. It suffices to say that, the antenna system consisted of a "T" type cage with a 100 foot flat top 70 feet high, and a radial counterpoise in place of a ground. Four type U.V. 204 Radiotrons were used in the transmitter, one as the master oscillator and three in parallel as amplifiers with a 2500 volt direct current power supply.

The station was a great success, and was awarded the prize offered by Mr. Burnham, of England, for the best station in the test. 1BCG's signals were heard in every state in the Union, in Scotland on December 9, 10 and 11; England,



Trans-Atlantic receiving apparatus installed and operated by Paul F. Godley at Ardrossan, Scotland. Ass't. Operator Piersen. 1921.
In this tent, which was blown down on one occasion by a high wind, Paul received the now famous message from the Radio Club station 1BCG at Greenwich, Conn.

Germany, Holland, Porto Rico, Vancouver, B. C., California and the State of Washington. The greatest distance covered was to Amsterdam, Holland, approximately 3800 miles, mostly over water, and 2600 miles over land to Smith River, Calif. Last but not least 1BCG sent three complete messages to 6XAD in Avalon, Catalina Island, Calif., and one 12 word message to Paul Godley in Ardrossan, Scotland, at 9.45-10.00 P. M. on December 11, 1921; all with an input of 990 watts and a wave length of 230 meters. This was the first time in history that an amateur station sent a complete message across the continent or across the Atlantic, and perhaps the first time that this feat had ever been accomplished with less than a kilowatt input and a wave length of 200 meters. This aroused such interest, in view of the low power and shortwave used, that such prominent men as Professor M. I. Pupin of Columbia University, and David Sarnoff, General Manager of the Radio Corporation of America, went to Greenwich to visit the station, and as Professor Pupin put it, in his inimitable way, "To see what you boys are doing"



"1BCG"

RECOLLECTIONS OF A MEMBER OF THE ENGINEERING STAFF OF 1BCG

by
EDWIN H. ARMSTRONG

The engineer without experience with the transmitter art of 25 years ago may well look at the wiring diagram of 1BCG and express wonder at the weird arrangements that were used. The engineering staff of 1BCG might well counter with the remark: "Who else up to that time had ever built a transmitter to cross the Atlantic on a 200 meter wave length in less than one week's time?"—a good enough answer under the circumstances. Better answers lie among the recollections of the engineering staff to account for the things that were done.

The writer of this section became actively interested in the transmitter design shortly before the 5th of December, when an observation made in New York City of the roughness of the tone of the "self rectified A.C. self oscillator" used at 1BCG recalled the success of a master oscillator power amplifier CW network that had been installed in the A.E.F. The superiority of the steady C.W. beat note over the I.C.W. and C.W. self oscillators then in use in all other nets had been observed throughout the Allied Armies.[1]

Discussion of these results led to the serious decision to switch over to a master oscillator-power amplifier with DC motor generator power supply, despite the major operations that would have to be carried out in the three days left before the tests began.

The first step was taken without difficulty. A 2000-volt motor generator was quickly obtained from the Electric Specialty Company located in the nearby town of Stamford, and a P-tube master oscillator circuit tuned roughly to 200 meters put into operation. After some trouble caused by heating and a few burnouts of components, a proper selection was made which gave fairly steady operation (over short periods of time, as we were to learn later). A couple of open iron core choke coils, located amidst the stores of the Hartley Research Laboratory at Columbia University, formed the filter which removed commutator ripple, so that the oscillator gave a clear, steady beat tone when listened to at an amateur receiver located in the neighborhood.

The second step was the one that was to cause the trouble. Bear in mind that at this time the art of neutralization was unknown, and that parasites, while known to exist, were looked on as a mysterious visitation of trouble which obeyed no known laws. The addition of two P-tubes in parallel as amplifiers produced all the strange effects that our present knowledge would enable us to anticipate. Tubes ran extraordinarily hot with much smaller plate currents than that current with which at other times they ran quite cool. Grid leads within the tube became suddenly incandescent, necessitating split second operation of the plate voltage switch to save the tube. Sometimes even the split second operation failed to save a tube.

For a period of about 36 hours of erratic behavior, the power stubbornly refused to appear in the antenna, but dissipated itself internally among the circuits, as evidenced by repeated component heatings and failures. None of us recall the number of "cut and try" changes that were made, but some time during the second day the important step was taken of including a series tuning condenser in the plate circuit of the multi-tube amplifier. Adjusting this condenser below a critical value produced an immediate stabilizing effect due, of course, as everyone now knows, to the introduction of a positive resistance reaction into the system through the medium of the plate-grid capacities.

From this point on the system was gradually stabilized and the power developed in the antenna rose steadily to an estimated 600 watts by the third day of the tests. The somewhat odd tap-on points of the various grids and plates shown in the diagram were arrived at experimentally, the test being the particular adjustment which stopped a particular parasite from playing around in the circuits.

The final problem was the keying of the transmission without spoiling the note. Attempts to key the master oscillator (with fixed bias on the amplifier grids) resulted in instability of the beat note due to heating, surges, etc. The oscillator was therefore kept permanently in operation and keying carried out by opening the amplifier grid leak circuit. A residual antenna current for open key conditions of about one-third that obtained with closed key conditions due to feed-through of oscillator power via the amplifier grid-plate capacity rendered the signal hard to read. This difficulty was solved for purposes of the test by arranging an auxiliary keying relay to alter the frequency of the master oscillator during the key-up conditions, the change in frequency being adjusted to carry the beat note out of the audible range of a receiver tuned to the main wave.

[1]This was the first instance of master oscillator sets used in military communications.

During the third day of the tests, after steady operating conditions had been established, our concern was principally with the steadiness of the note, and various troubles due to poor contacts caused by heating and the like were located. Information about the steadiness of the note was obtained by working various stations during the day, and the conflicting reports worried the staff no end. Finally it was observed that the reports of a good note came from stations at a distance, while the reports of a poor note were almost uniformly from stations in the local area. Subsequently the reason became clear—the high level of the signal was pulling the frequency of the self-heterodyne receivers into step with it! After that we rigged up to observe the frequency within the station on the third harmonic of the monitoring oscillator.

Of course after 1BCG got across three days running, the engineering staff were on top of the world. They let it be known that they were the boys who knew how to design transoceanic transmitters. Period! However, when for two days running the reports of no signals came through from Godley, the operating staff became critical. Suggestions were made that the transmitter must be wearing out, or that the signals must somehow be getting out of the groove that we thought we had worn through the ether to Ardrossan.

With the few days remaining of the tests, something had to be done quickly. Recalling again that the CW net in the A.E.F. had been set up by connecting two motor generators in series to give twice the voltage on the plates of the tubes used for which they were rated, it was suggested that perhaps the tubes presently in use might also operate more "efficiently" if higher voltages were applied to the plates of the amplifier. Another motor generator was rushed in from Stamford—this time a *2500* volt affair. It was duly connected in series with the motor generator then operating, and the resulting 4500 volts applied to the plates of the P.A. It worked—and held together throughout the balance of the tests. It appears that the transmitter did operate more "efficiently", but no check could be made due to the failure of the antenna hot wire ammeter to hold its calibration after a severe case of overheating.

However, the engineering staff received its first lesson in the vagaries of North Atlantic short wave propagation. The forces of Nature were not to be overcome by mere brute force methods, at least not by such amounts of power as could emanate from an "10 X 14 hut". I believe the transmitter demonstrated its increased efficiency during the post-test period and that the engineering staff regained its standing with the operating staff when they were able to work every State in the Union without difficulty.

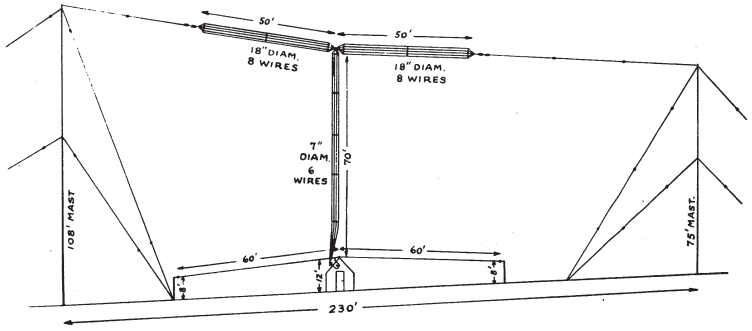
Station 1BCG

A Paper Presented by George E. Burghard at meeting of Radio Club of America, Columbia University Dec. 30, 1921.

BEFORE going into the description of station 1BCG it may be well to consider for a moment the history of transatlantic amateur communication. The idea of transmitting American amateur signals to the Continent originated with one of the prominent members of the Radio Club of America before the world war when Mr. L. G. Pacent presented the matter for the consideration of the board of direction. Nothing definite was accomplished, however, and when Mr. Thomas Styles went to France after the war, Mr. Pacent suggested that the club erect a station to attempt communication, but the proposition was abandoned as too costly at the time. Some time after this Mr. Philip Coursey of "The Wireless World" took up the matter with Mr. White of the Wireless Press with like result, everyone being sceptical as to the success of the affair. Then Mr. M. B. Sleeper, at that time radio editor of "Everyday Engineering", took the idea up in earnest and laid the plans for the first amateur transatlantic test but was later forced to give it up. The American Radio Relay League took up the task at Mr. Sleeper's request, where he left off, and the first test was run under their auspices. The periods of transmission, however, were too short and no signals were heard in Europe. Then it was decided by the League to have another test the following winter, making the periods of transmission longer, and to send a representative to England to receive the American signals. Mr. P. F. Godley was selected as the logical man to go to England. He sailed for England in November, 1921, and it is here that the story of 1BCG begins.

On November 18th six members of the Radio Club of America at an informal meeting decided to build a transmitting station that would be heard in Great Britain. The six men were E. H. Armstrong, E. V. Amy, John F. Grinan, Walker Inman, Minton Cronkhite, and G. E. Burghard.

Various locations for the station were suggested and it was finally decided to build at Greenwich, Conn., on the site of Mr. Cronkhite's station 1BCG. Thru the courtesy of Mr. E. P. Cronkhite the necessary land and facilities were obtained. The antenna and transmitter were designed and decided upon and work was begun at Greenwich on November 19th. The staff worked night and day in snow and rain until finally on November 30th the antenna and counterpoise were in place. The transmitter, which at that time was of the self-rectifying type, was also well under way and the first signals were sent out at 10:40 p.m. November 30th, with expectedly poor results. Much trouble was experienced from then on until on Dec. 5th it was decided to supplant the A.C. system with a D.C. master-oscillator set



Antenna at 1 B C G

Editor's note:

This paper was read before the Radio Club of America by its president, George E. Burghard, at the December 30th meeting at Columbia University in 1921. It gives a complete description of the station with circuit wiring diagrams of the transmitter and drawings with full dimensions of the antenna and counterpoise systems. The operation of the master oscillator power amplifier transmitter is fully explained and operating data such as input and output power together with circuit constants are accurately recorded. The distances covered and the various records established by 1BCG are also set forth in detail.

This system, which will be described in detail later, was made permanent and was used in the transatlantic tests and is still in use at 1BCG at the present time.

The antenna system used is of the type T cage with a radial counterpoise. The dimensions are as shown in Fig. 1. The antenna proper is hung between two pipe masts 230 feet apart and 108 and 75 feet high, respectively. The two horizontal sections of the cage are each 50 feet long, 18 inches in diameter, and consist of eight phosphor-bronze wires. The vertical section is 70 feet over the top of the counterpoise, 7 inches in diameter, and consists of 6 wires. The counterpoise wires can be seen in relief stretching from the top of the transmitting shack which was located directly under the middle of the antenna, thus placing the transmitter in the center of the system. A bird's-eye view of the counterpoise is shown in Figure 2.

As can readily be seen the system is divided into two fan-shaped halves, each containing 15 wires all of equal length, i.e., 60 feet, and radiating from the transmitter as a center. The reason for this division of the counterpoise is of no importance since it was intended to prevent harmonics in a predesigned system which was never put into practice. The natural period of this system of antenna and counterpoise from actual measurement proved to be between 190 and 195 meters.

The resistance of the antenna and counterpoise thru a range of wave lengths from 200 to 330 meters was found to be as follows:

Wave Length Meters	Resistance Ohms
200	40
210	31
215	18
225	16
230	15.5
240	14
270	12.5
290	17
310	12
330	9

Unfortunately no further readings were taken but since the working wave length of the station was 230 meters a fair idea of the antenna efficiency can be obtained from the figures at hand. The sudden rise in

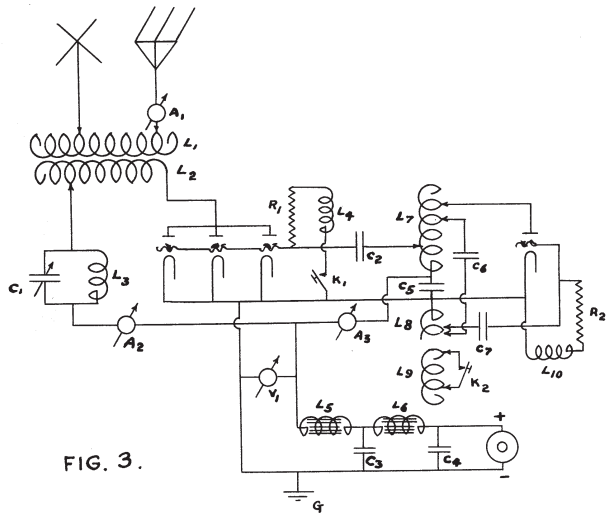


FIG. 3.

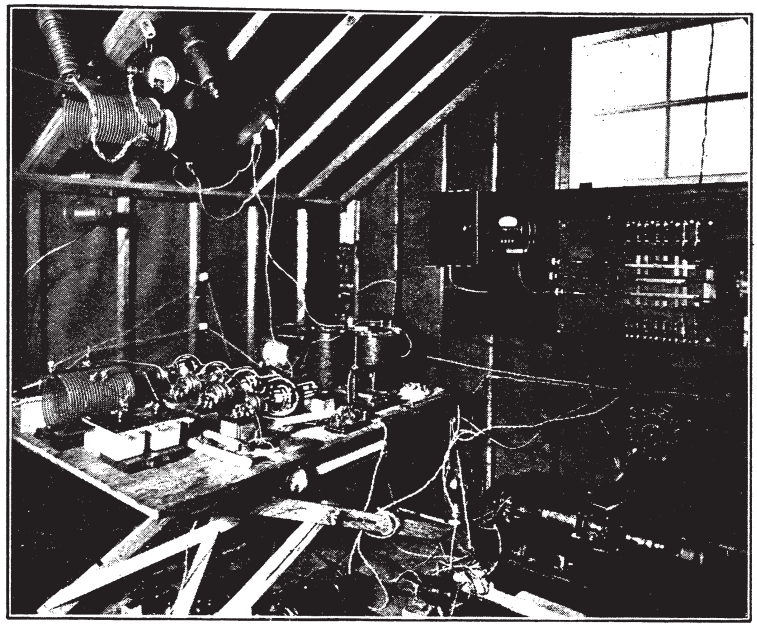
Constants for Fig. 3

A_1.....0-15 thermo-couple ammeter
A_2.....0-3 ammeter
A_3.....0-500 milliammeter
C_1..... variable
C_2.....0.002 mfd.
C_3.....0.250 "
C_4.....0.0017 "
C_5.....0.250 "
C_6.....0.001 "
C_7.....0.002 "
L_1.....5⅛ turns, UL-1008
L_2.....36 turns, 5" diam.
L_3.....3 millihenry choke
L_4.....3 millihenry choke
L_5.....9 henries
L_6.....9 henries
L_7.....16 turns, UL-1008
L_8.....3 turns, UL-1008
L_9.....3 turns, UL-1008
L_{10}.....3 millihenry choke
R_1.....2500 ohms
R_2.....1000 ohms
V_1.....3000 volt meter
K_1 K_2.....relay signalling keys

resistance at 290 meters was later found to be due to the receiving antenna which had a fundamental wave length of approximately 290 meters.

No real earth ground was used in the station except to ground the filaments of the transmitting tubes, and for receiving; this consisted of several four-foot ground stakes driven into the ground.

The design of the transmitter centered about one main idea, the production of that type of 200 meter wave which would be most effectively handled by the superheterodyne method of amplification and that type of audible signal which would be most effective on the combination of the telephone and the human ear.



Interior view of the station

To meet the first condition, that is, the electrical requirements of the superheterodyne, a pure undamped wave must be used. It is obvious that the superheterodyne with its great selectivity and highly resonant system cannot give its maximum response when there is any discontinuity or variation in amplitude in the transmitted wave. Undamped waves must be used, waves of a type which can be obtained only from a vacuum tube oscillator with a continuous current plate supply.

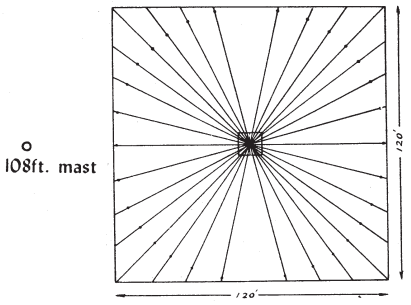
To meet the second condition (the combined electrical characteristics of the telephones and the physiological characteristics of the human ear) a current must be produced in the telephones which corresponds with the natural period of the diaphragms and which remains constant within the narrow limits permitted by the resonance curve of the diaphragm and the physiological characteristics of the ear. There must be no variation in this frequency which will disturb the mechanical resonance of the diaphragm, nor flutter in note which will disturb what may be called the physiological resonance of the ear. The permissible limits of variation in frequency for a 1000 cycle note are well under 100 cycles. Hence for heterodyne reception at 200 meters or 1,500,000 cycles, a variation of frequency of less than 1/100 of one percent would be extremely disturbing to the operator and a variation of 1/20 of one percent would be sufficient to carry the note into an inaudible frequency.

The whole proposition therefore comes down to the construction of a vacuum tube transmitter producing undamped waves of an absolutely constant frequency which stays constant with an instantaneous application of a load of 1 K.W. There is but one type of transmitter which can possibly meet this condition—the master-oscillator-amplifier type with a motor-generator for the plate supply.

The general layout of the transmitter is illustrated by Figure 3. Four type U.V.-204 Radiotrons were used, one as the master oscillator, three in parallel as amplifiers. The filaments of these tubes were connected in pairs of two in parallel and each pair was lighted by A.C. obtained from the ordinary type of filament-lighting transformers. The plate supply was ob-

tained from a double-commutator 2200 volt 1.5 K.W. continuous current generator with A.C. drive.

The master-oscillator circuit employed was of the standard split inductance type with a fixed tuning condenser of the rather large value, for 200 meter work, of .001 mfds. The inductance consisted of a helix of 25 turns of copper strip wound edgewise, having a diameter of about 6" and a length of 9". This choice of constants was arrived at largely on account of an accident to several condensers of smaller



Counterpoise at I B C G

capacity in the master oscillator circuit on the first night of the tests. The only available condensers capable of standing the required voltage were two .002 mfd. mica condensers which were connected in series to give .001 mfds. The other constants of the circuit were then adjusted to fit this capacity. The usual grid condenser, with a high resistance leak and choke coil connected between grid and filament, was used.

The amplifier consisted of three tubes with their respective grids and plates connected in parallel. The grids were connected thru a series condenser to a tap on the plate side of the master-oscillator inductance. The usual grid leak and choke coil were connected between grid and filament. The plate circuit was coupled to the antenna thru a two-coil oscillation transformer. The primary or plate side of this transformer consisted of a coil of 36 turns of litz, having a diameter of 5" and a length of 3½". The secondary or antenna coil consisted of about 6 turns of edgewise-wound strip 6" in diameter. The plate circuit of the amplifier was tuned by means of a capacity consisting of three .005 mfd. variable air condensers connected in series to withstand the voltage. The path for the continuous current in the plate circuit was completed by a choke coil connected across the three condensers.

The filter circuit consisted of a two stage series inductance, shunt capacity filter, both inductances being placed in the positive generator lead. These inductances were of the open-core type, wound with No. 22 B. & S. wire, each having an inductance of 9 henrys and a direct current resistance of 85 ohms. The capacity of the two shunt condensers was .25 mfds. each.

The method of signalling used was as follows: The master-oscillator was connected permanently to the generator and ran continuously whenever the motor-generator was running. Its circuit was never broken. Signalling was accomplished by means of two magnetically-controlled keys. The first opened the grid leak circuit of the amplifiers. The second simultaneously shortened the wave length of the master-oscillator about 5 meters by short-circuiting a couple of turns of a coil in inductive relation with the master-oscillator circuit. Under steady operating conditions this transmitter maintains 6 amperes in the antenna with an input of 990 watts into the plate circuits of all four tubes. The power in the antenna for this current is 558 watts, corresponding to an antenna resistance of 15.5 ohms. This gives a plate efficiency of about 56% with 2200 volts on the plates. On account of various breakdowns in different parts of the apparatus this output was not obtained and the set was not in condition for steady operation until 1:10 A.M. of December 9th.

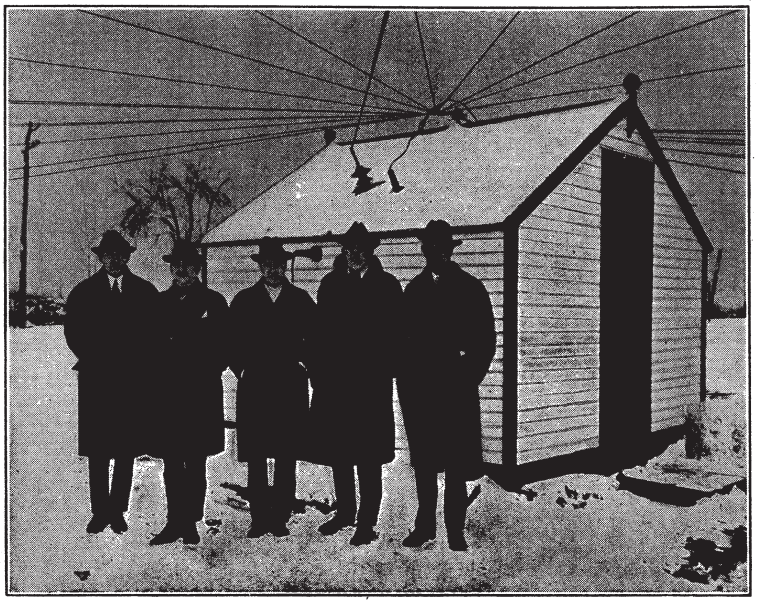
There are some points of interest about the set which are novel. Probably the most important is the stability of the master-oscillator. This is due to the type of oscillating circuit and the relatively large power of the master-oscillator, and to the tuning of the plate circuit of the amplifier which permits the neutralization of the reaction of the amplifier on the master-oscillator system. This is accomplished by adjusting the tuning of the amplifier plate circuit and the coupling with the antenna until the plate current of the master-oscillator tube remains unchanged when the key is closed.

In addition to this effect the series tuning system in the amplifier plate circuit has the very important advantage of increasing the transfer of energy to the antenna circuit when the antenna coil has but a few turns. It therefore assists in operating the antenna system close to its fundamental wave length.

It is interesting to note here that great difficulty was experienced in the first few days of operation in obtaining reliable information regarding the steadiness of the note. This was due to the fact that signals from 1BCG were sufficiently strong to affect and alter to a considerable degree the frequency at which receiving sets with-

in a radius of fifty miles were oscillating. This resulted in a bad note. The solution to this difficulty was found by setting up a self-heterodyne detector in the station with 150 volts on the plate, without a stopping condenser, and with a tuning circuit of small inductance and large capacity. By adjusting the frequency of this circuit to one third of the frequency of the station, beats were obtained between the fundamental of the station and the third harmonic of the receiver. This enabled the frequency of the station to be observed perfectly. Observation on a windy night, when the notes of all C.W. stations heard were varying so badly as to be almost unreadable, showed the frequency to be absolutely unaffected by the motion of the antenna. The reports on this set from all parts of the country show beyond question that radiation of this kind is superior to very many times the energy radiated from the ordinary types of C.W. transmitters.

In connection with the actual operation of the station it will be interesting to quote from the engineering log in order to give an idea of the difficulties encountered: "Dec. 6th—During the evening the master oscillator is connected up. Two amplifiers in use. Tubes running very hot. A CQ was sent out at 3:30 A.M. and condensers boil over." "Dec. 7—One tube is found to be defective leaving only one amplifier. While we are adjusting the master-oscillator for cooler operation many stations are heard sending in Transatlantics. Finally sent CQ to Godley with 3 amps. in antenna. More tubes arrive—set is in operation until condensers in the master-oscillator circuit heat up so that it is advisable to shut down." "Dec. 8—Much trouble is experienced with condensers in master-oscillator circuit. Tested for adjustment all nite. 1:12 A.M. finally got condensers fixed with 6 amps. radiation and worked until 6:35 A.M. All OK now". From this it can be seen that the station was actually not in operation until the 9th of December and in the short period of three weeks to date has accomplished some amazing long-distance feats.



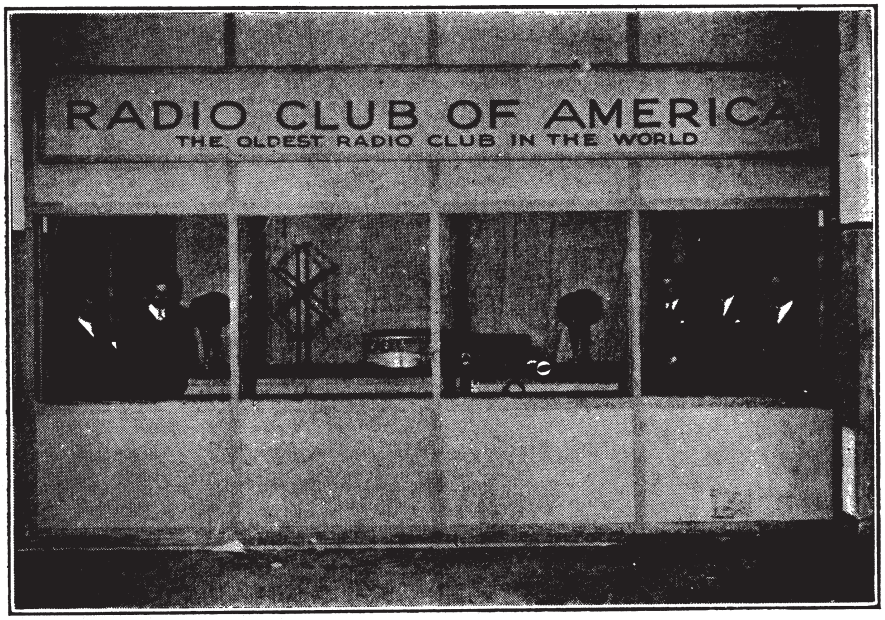
The station building at 1BCG and five of its owners. Left to right, Messrs. Amy, Grinan, Burghard, Armstrong, Cronkhite. Mr. Inman is missing in this photo. Note the counterpoise radiating from the top of the station, and the lead-in from it and the antenna.

1BCG's signals have been heard in practically every state in the Union; in Scotland on Dec. 9, 10 and 11; England, Holland, Porto Rico; Vancouver, B. C.; California and Washington. The greatest distance covered is to Amsterdam, Holland, approximately 3800 miles, mostly over water, and 2600 miles over land to Smith River, Calif. Last but not least 1BCG has established new records by sending three complete messages to 6XAD in Avalon, Catalina Island, Calif., and one 12-word message to Ardrossan, Scotland, at 9:45-10:00 P.M. Dec. 11, 1921; all with an input of 990 watts and wave length of 230 meters.

Photographs of 1BCG, thru the courtesy of Mr. J. Edw. Brown, of 1BKA, Glenbrook, Conn.

By this time the number of amateur stations had increased to a tremendous extent, and with broadcasting just about beginning, communication was becoming almost impossible. The Radio Club investigated the situation and found that most of the interference was caused by spark and interrupted continuous wave transmitters. It therefore undertook a vigorous campaign of advice and suggestion, through papers presented before the membership, to educate the amateur in the whys and wherefores of pure continuous-wave transmission and its many advantages over the older forms. The campaign proved successful and is still in progress.

It was at one of these meetings in 1922 that E. H. Armstrong startled the radio fraternity by producing a sufficient volume of music to fill the large lecture hall, using his newly invented super-regenerative circuit, a loop aerial and only one Western Electric J Tube. This performance, of course, had never been equalled, and when it is considered that the signals were coming from station WJZ, at Newark, N. J., and that the receiving set was located in a steel building with a copper roof at Columbia University, it was certainly an epoch-making event.



Radio Club receiving booth at Radio Show in Grand Central Palace, 1922.

In December 1922, The Radio Exposition Company held a large Radio Show at the Grand Central Palace, New York. As everyone knows, if all the exhibitors at a Radio Show are permitted to receive broadcast programs at the same time, chaos would result due to heterodyning between the receivers themselves. In order to avoid this difficulty, the exposition directors decided to permit only one concern to do all the receiving. This, of course, was an unhappy thought since there was no way of deciding which company this should be, without causing vigorous protest from the other exhibitors. Finally it was decided to choose a non-commercial organization. The lot fell to the Radio Club of America. A special committee was appointed and the work begun. Tests were made a week prior to the opening of the show with various types of antennas and finally it was found that even a loop would pick up too much of the noises resulting from commutator sparking, circuit breakers, and electric locomotive shoes, from the power houses in the vicinity and the New York Central tracks directly beneath, so that a single wire about fifteen feet in length had to be used. The problem proved to be two-

fold and a great deal more ponderous than was at first anticipated. First there was the matter of doing away with extraneous noises so as to deliver pure radio signals to the power amplifiers and secondly a physical problem of placing the loud-speaking horns so that there would be no re-echoes or dead spots. The first was solved after much experimentation by the small antenna, a 600-meter frequency trap, and a super-heterodyne receiver. The acoustic problem, however, offered stubborn resistance. Six loud speaker units with four-foot straight horns were obtained, and the question was how to place them so that the sound would fill the entire Grand Central Palace exhibition hall. At first, they were hung radially in a cluster from the ceiling in the centre of the floor space. This proved unsuccessful since many re-echoes were produced from the side walls and dead spots resulted from large columns. Finally, after trying several other positions, it was decided to place the horns on the balcony directly in front of the specially constructed booth which housed the receiving and amplifying apparatus. It is interesting to note that all the horns had be placed together because any separation by placing horns at various points about the hall produced out of phase relationship and distortion. As it was, only five horns could be used, since the sixth faced a wall and produced a decided re-echo which interfered with the speech to a marked degree.

This system proved very successful and in spite of many sceptical opinions at the outset, sufficient volume was produced to fill the hall amply, and on the last night, the signals from WEAF were reproduced with such intensity that several of the audience on the main floor were seen to hold their hats in humorous indication of their approval.

In 1922, when Secretary Hoover found it necessary to call a meeting of the radio interests before a special committee of his choosing, the Radio Club was represented on the Committee by E. H. Armstrong. Thus the Club again as of old took an active part in the regulation of radio by Congress. This special committee reported direct to Congress on its findings, and did much to help frame the present regulations.

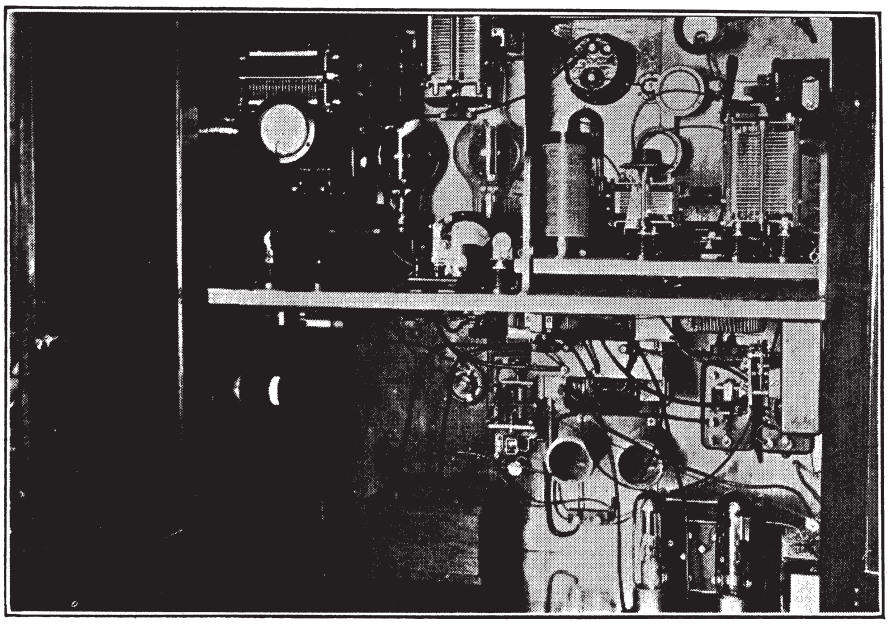
With the advent of Radio Broadcasting a new problem now faced the amateur, namely, that of interfering with broadcast reception. The Radio Club realizing the seriousness of the situation at once started a campaign of education and its policies can best be summed up in the following article written by its president at that time:

"The Radio Club of America was organized to propagate the art of radio telegraphy and telephony in all its branches, and true to this ideal it has always lent its aid to the best of its ability to all phases of the art. It originated as an amateur organization with a scientific purpose. It fought for the continued existence of the amateur and helped to educate him. It lent a helping hand to commercial radio, by research and cooperation wherever it could. It gave all it had to the Government when it was in dire need of radio personnel, and, finally, when that new element in radio cropped up—the broadcast listener—it gave him much needed assistance. This organization belongs to no one branch of the radio art but to all branches and therefore its duty at present must necessarily be one of education. Through the medium of its papers and discussions as well as the individual efforts of its members, it must endeavor to terminate the disastrous conflict which has sprung up between the original radio amateur or traffic amateur and the broadcast listener. Both classes must be trained and assisted to become mutually beneficial to one another. The traffic man must be shown how to construct his transmitter so as to create minimum interference and the broadcast listener how to operate his receiver at the point of maximum selectivity. Neither one nor the other can or should be permitted to die out, for each has his own particular value. The broadcast listener class is composed of the general public whose pleas-

ure and comfort must not be interfered with at any cost, while the splendid services of the traffic amateurs in the World War will never be forgotten and surely entitle them to an everlasting right of existence. But, unless these two warring factions, can be educated to cooperate and aid one another, one of the two is doomed; and this task of education for the good of the radio art must now be the important work of the Radio Club of America as well as all other radio clubs throughout the United States."

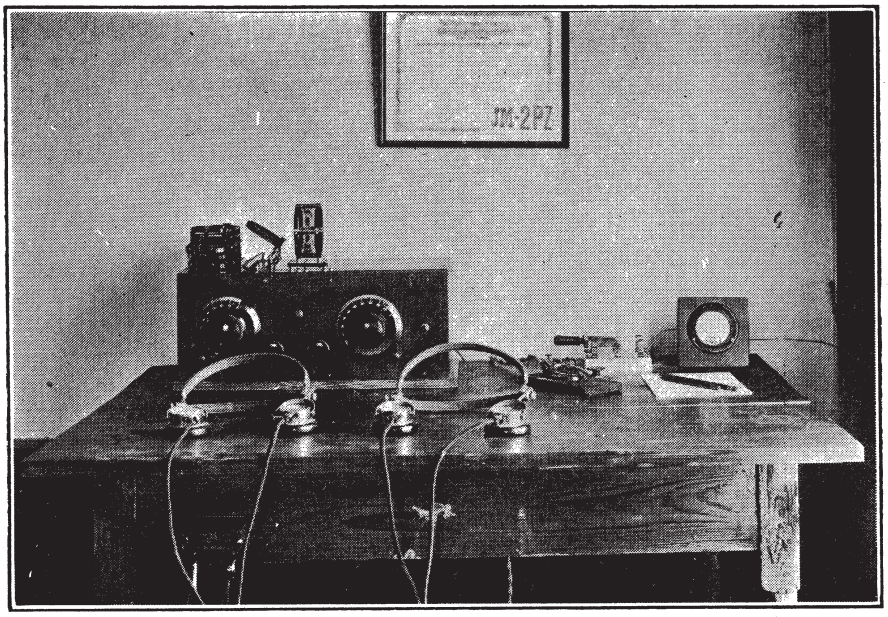
Radio experts at the White House in 1923. Left to right: Howey, Burghard, Hogan, Sheppard, Godley.

But the club did not confine its activities along these lines, entirely to the amateur. In 1923 the Boston American organized a committee of radio experts to present the problem of interference by Naval stations, which were causing great annoyance to broadcast listeners, to President Coolidge. Messrs. Paul Godley, J. V. L. Hogan and George E. Burghard, were asked to serve on this committee and



Transmitter, station "2AG", C. R. Runyon, Jr., Yonkers, N. Y., 1927. This is a typical layout of the C. W. tube transmitter short wave, period.

visited the President in Washington on Dec. 10th, 1923. Jack Hogan, acting as spokesman for the committee, so ably stated the case that even the laconic Mr. Coolidge uttered an exclamation when he heard that his own radio speech had



Receiver, station "NJ2PZ", John Grinan, Kingston, Jamaica, B. W. I., 1926.

been rendered unintelligible in his home town, through the interference of the transmitting station at the Boston Navy Yard. The matter was at once referred to Secretary Hoover.

Now, the short wave era of amateur radio was at hand. To be sure the original small boys had grown to be full fledged men of affairs. Most of them

Amateur Casts Vote 1,700 Miles Away by Radio

John Grinan in Jamaica on Business Listens In on the Discussions at Meeting in Yonkers.

Sends Meeting Proceedings 1,700 Miles

Casting his vote at a recent board of directors' meeting at the Radio Club of America, although 1,700 miles away, John Grinan, old wireless amateur, in business in Jamaica, West Indies, "sat in" on the balance of the discussion, getting the entire proceedings from his friend, C. R. Runyon jr., 544 North Broadway, Yonkers, where the meeting was taking place.

This is believed to be the first authetnic time that a vote was asked for, and received, all by radio, while the meeting was in progress.

Hears Proceedings of Meeting

Following the receipt of the vote Grinan followed the proceedings of the meeting, being kept constantly informed about the developments by Runyon, who stayed at the key of his transmitter. The conversation, started some time after 5 p. m., continued on until a quarter of 7, when the distant operator and director signed off to keep

C. R. Runyon jr. operating his amateur station at Yonkers.

were sent down, and assembled quickly, with the friendly help of Runyon, who checked by wireless the various adjustments made by the experimenter in Jamaica. Some changes in the apparatus layout were advised by radio, and later made, which improved signals to a great extent.

Although the authorized wave-band for American amateurs communicating on short waves is from 35.7 to 42.8 meters, Grinan has been using 33 meters. This is the official wave alloted him by the British Postoffice authorities. His power is but fifty watts, and the sending has been mostly done in the late afternoon, during daylight.

In New York Runyon has a crystal controlled push-pull 250-watt set, which is tuned to 80 meters. His call letters are 2AG. Grinan has been assigned NJ-2 PZ.

New York Tribune, February 6, 1927.

held prominent radio positions in that rapidly growing industry. Naturally the character of the membership of the club as well as that of the papers, underwent a similar change. The club had now all the earmarks of a genuine scientific body. The spirit of the organization, however, never changed. These men, now engineers, executives or scientists were still amatuers at heart. Many of them still had their own stations, and using the very latest equipment were nightly communicating with the whole world on 80 meters and below. Notable among these experimenters we find Randy Runyon and John Grinan who attained great prominence with their activities. Runyon's station 2AG was located in Yonkers, N. Y., and from there he worked practically every country in the world.

In 1925 when the Hamilton Rice expedition went to the Amazon River in Brazil, John Swanson, an old member of the club, went along as chief radio operator. They were equipped with long and short wave apparatus, but most of the traffic was handled through Runyon at Yonkers, who was in nightly contact with Swanson on Short waves. In fact, on one occasion when the branch expedition was lost up the river, 2AG succeeded in working them on their portable set, when they could neither raise nor hear the base station, and relayed their position to the main camp thus ultimately bringing about their rescue.

AMATEURS RELAY PRIZE FIGHT STORY

Radio Club Station and Jamaica "Ham" Reach Tom Heaney's Friends in Antipodes.

Through the various steps of broadcasting, short-wave transmission by dot-dash, and relaying from a distant point where conditions happened to be more favorable at the time, a blow-by-blow description of the boxing bout between Tom Heany and Pouling Uscundum was placed in New Zealand and published in the afternoon papers just a few hours after the fight, when New Yorkers had tuned in for the night.

The fight, blow by blow, was broadcast by Jack Philbin, through Station WMSG in Manhattan. This broadcast was picked up with a superheterodyne at Station 2 AG in Yonkers and transmitted an instant late on a 40.9 meters to NJ 2 PZ at Jamaica, British West Indies, some 1,500 mile away. An effort was made to work New Zealand, the home of Tom Heany, direct, but the fading on the 40.9 meter wave length was too severe for direct operation.

At the end of the fight, however, NJ 2 PZ transmitted the blow-by-blow description to OZ 2 AC at New Zealand, on 21 meters. The latter amateur station was the scene of excitement, as newspaper representatives received the dot-dash reports juact as rapidly as they were transcribed, and then rushed off to get their stories into type for the afternoon edition.

In order to keep up with the blow-by-blow description of the rapid-fire announcer, it was necessary to telegraph letters for whole words, and combinations such as "Heany lands right on jaw" became simply "H R J" in this nam shorthand.

Station 2 AG is the official station of the Radio Club of America, and is owned and operated by C. R. Runyon, jr. At the Jamaica end was John Grinan, also an active member of the Radio Club of America and an old hand at amateur radio.

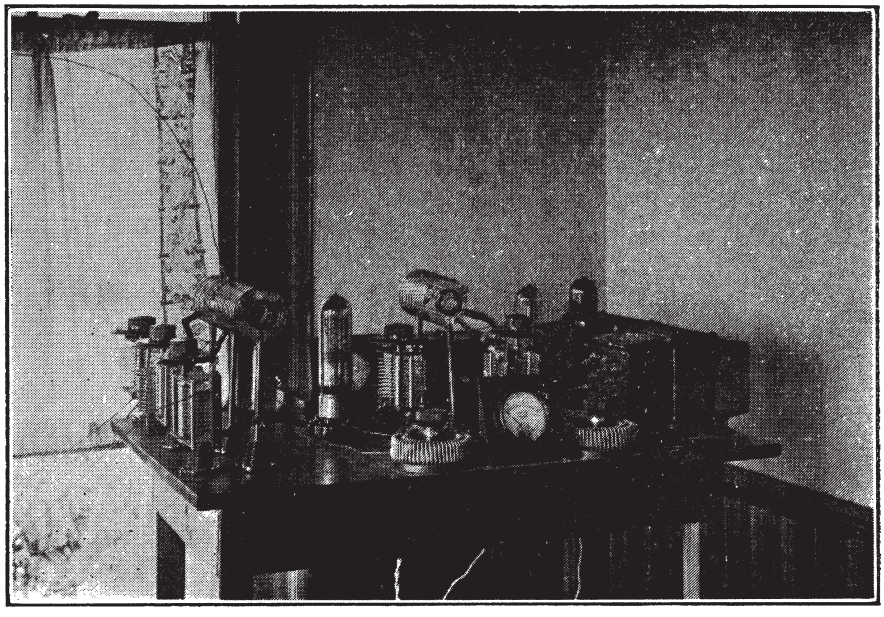
Brooklyn Times,
April 17th, 1927.

Johnny Grinan, who has the distinction of being the first amateur to send transcontinental signals and messages, as well as trans-Atlantic messages, built his station NJ 2 PZ in Kingston, Jamaica B.W.I. This station later known as VP 5 PZ grew to be one of the most famous amateur stations in the world. He worked every country, and on several occasions worked distant stations the long way around the globe. At the time of the Tom Heaney fight in the U. S. he succeeded in receiving the returns from a U. S. station and relaying them direct to Tom's home town in New Zealand, blow for blow, for which he was roundly thanked by Heaney's admirers some 7000 miles away.

One night in 1927 the Radio club directors were holding a meeting at Runyon's home in Yonkers. A very important matter was up before the board and a single vote became necessary to decide the question. Randy simply turned on the juice, called John in Jamaica, explained the situation to him, and John cast the deciding vote by radio, thus creating a somewhat novel precedent.

These are of course only a very few of the interesting incidents of radio progress. Space will not permit the telling of the activities of the many other, now middle-aged, small boys, but we know that they too, are still true to their old love, Radio.

On May 13th, 1926, the Radio Club held its first regular annual banquet at the Hotel McAlpin in New York City. It was indeed a gala affair, over 150 prominent radio men attended, among whom were, Professor M. I. Pupin, David Sarnoff, Gano Dunn, E. H. Armstrong and J. V. L. Hogan. Professor Pupin was the guest of honor and made a stirring speech which was broadcast through the facilities of station WMCA. In his speech the Professor denounced the White-Dill



Transmitter, station "NJ2PZ"

bill, which was pending at that time, and purported to take the control of radio out of the hands of the department of commerce and empower a special Federal Radio Commission to deal with the difficult problems of regulation. He closed his address with this parthian shot of advice to the Senate: " 'Noli me tangere,' which in plain Anglo Saxon means, 'hands off.' "

Radio Club 17th anniversary banquet, Hotel McAlpin, N. Y. C., 1926.
Prof. M. I. Pupin guest of honor.

Several other speeches were made during the course of the evening, and as a crowning event Professor Pupin and David Sarnoff were made Honorary members of the club. A good time was had by all.

THE WORLD:

LEAVE RADIO 'AS IS,' URGES PROF. PUPIN

"Government Hands Off" Is General Tenor of Speakers at Annual Dinner

SENATE'S PLAN DENOUNCED

Hoover Praised for His Policy of Co-operation

"The Government must keep its hands off radio," was the tenor of speeches at the annual dinner of the Radio Club of America, in the Hotel McAlpin last night. Among those who stressed this necessity before the 140 diners were Michael Pupin, professor of electro-mechanics, Columbia University; David Sarnoff, Vice President and General Manager of the Radio Corporation of America; Gano Dunn, consulting engineer, Past President of the American Institute of Electrical Engineers Major Edwin H. Armstrong, inventor of the regenerative and super-regenerative radio circuits used throughout the world, and John V. L. Hogan, consulting radio engineer. E. V. Amy, President of the Radio Club of America, presided.

Prof. Pupin and David Sarnoff were elected honorary members of the club.

Prof. Pupin told how the club was started by radio amateurs. Although some of these have become great experts, he said, they are still amateurs in the highest sense of the world. Commercial considerations were not allowed to bias the scientific opinions of either himself or his audience. Continuing, he said:

"It is not so much the occasional inventor who nurses a great technical art as it is the intelligence of a well organized and liberally supported research laboratory. When I think of that I am perfectly convinced that very few of the great advances in the telephone art would have happened under Government ownership.

"Some six or seven years ago I opposed a bill which proposed to place the radio art under Government ownership. The Congressional Committee believed me. If it had not we would have no radio broadcasting art to-day. This art was developed in this country first, because you and I and our industrial research laboratories were free from all interference on the part of bureaucracy.

"The Department of Commerce has consulted us, because it has found that nothing can be done without us, the parents. It has a democratic and not a bureaucratic method of procedure. To replace it by another instrumentality of the Federal Government would mean to eliminate from the present critical condition of the young radio art an intelligent and experienced co-operator without any assurance that the new instrumentality will ever be equal to its task.

"If it is proposed that this new instrumentality shall be a commission, resembling in its authority and mode of operation an Interstate Commerce Commission, then it will certainly be a failure. Who can tell to-day whether a year or two, or several years hence, the best wave lengths for broadcasting will be ten, fifty, 100 or several hundred metres? Who can tell what will be in the very near future the best method of establishing selectivity? Who can tell what additional means must be employed to diminish the annoyances of static?

"President Coolidge is right when he favors the Department of Commerce to co-operate, just as heretofore, with the creators of the radio art in the solution of the outstanding problems.

"The Senate is wrong when it proposes to solve a complicated scientific problem in its own way without a thorough knowledge of the science which the solution demands."

New York World, May 14, 1926.

Later in the same year when the broadcast situation was becoming dangerously involved due to the pending legislation, the club went on record by issuing the following resolution, passed at a special meeting of the board of directors:

"RESOLVED that until the present limitations of the powers of the Department of Commerce shall have been removed or other provisions made by legislation, no broadcaster should change his wave length or hours on the air or increase his power without first receiving the approval of a committee representative of the art organized for the purpose, and be it further

"RESOLVED that the Radio Club of America, organized for the object, among others, of developing the radio art, hereby declares that the present condition in the radio field, caused by the temporary removal of legal restrains, is a new occasion for the exercise of that capacity of self-government and respect for the interest of the public, in which the radio art has led, and it further declares that it will hold its members responsible in the opinion of the club for their conduct in the observance of the principles underlying these Resolutions."

R. C. of America for Continuance of Old System

Radio Club Thinks That Hoover Regulations Worked Well.

AT a special meeting of its board of directors the Radio Club of America—the oldest radio organization extant—drew up a resolution backing the regulations heretofore rigidly observed in broadcast practice. While the club has no authority other than over the activities of its extensive membership, the action at this time is significant in the sense that this club has always stood for the rights of radio amateurs and broadcast listeners, thereby safeguarding the best interests of the radio art.

The resolutions drawn up by the board of directors of the Radio Club of America, with regard to the present broadcast situation, read as follows:—

"Resolved, That until the present limitations on the powers of the Department of Commerce shall have been removed or other provisions made by legislation, no broadcaster should change his wave length or hours on the air or increase his power without first receiving the approval of a committee representative of the art, organized for the purpose; and be it further

"Resolved, That the Radio Club of America, organized for the object, among others, of developing the radio art, hereby declares that the present condition in the radio field, caused by the temporary removal of legal restraints, is a new occasion for the exercise of that capacity of self-government and respect for the interest of the public, in which the radio art has led; and it further declares that it will hold its members responsible, in the opinion of the club, for their conduct in the observance of the principles underlying these resolutions."

The club has always taken an active interest in all legislation outlined to affect the rights of radio amateurs and broadcast listeners. In 1910 a delegation was sent to Washington to protest against the Depew bill, and this measure was largely responsible for the defeat of that bill. In 1912 action was taken to defeat the Alexander bill. These bills aimed to stifle the activities of the radio amateur. In 1910 one of the first amateur radio telephone stations in the world was constructed and operated by members of the club. Music broadcast from it was received by many of the U. S. battleships anchored in the Hudson River. In 1921 the first amateur message ever sent across the Atlantic was transmitted from a club station erected for that purpose, the message being received in Scotland by a club member who went abroad for the test. For these and other reasons the Radio Club of America can be expected to follow the present broadcast developments with more than ordinary interest.

New York Telegram, August 7th, 1926.

In March, 1927, when the smoke of battle had cleared and the White-Dill bill had become a law, the Radio Club once more arose to the occasion, and strongly recommended the appointment of Robert H. Marriott, one of its most prominent and honorary members, to the newly formed Federal Radio Commission. Ernest V. Amy, president of the club at the time, sent a telegram to President Coolidge, urging the appointment.

Boosts Marriott as Commissioner

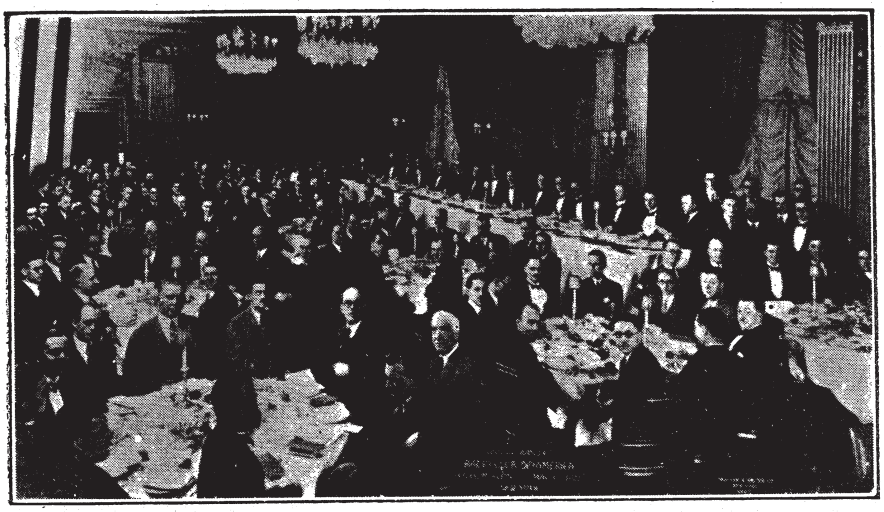
The appointment of R. H. Marriott, first president of the Institute of Radio Engineers, is being sponsored by various radio organizations. The Radio Club of America, when informed of the passage of the Dill-White bill Friday evening, sent the following telegram to President Coolidge:—

"Oldest radio club in the world begs you to consider R. H. Marriott, of New York, for member of the Radio Commission. Mr. Marriott is an old and experienced radio man—knows art and practice thoroughly. He is not connected with any company or interests, has wide acquaintance and support in the radio field and is universally liked. Mr. Marriott would make an ideal and popular choice as one of the five Radio Commission members."

New York Telegram, February 26th, 1927.

In the past few years there had, to be sure, been much discussion about incorporating the club, but no definite action had been taken. Towards the latter part of 1928 the board of directors finally took the necessary steps by appointing a special committee to have the papers drawn up. The result was, that on February 4th, 1929, the club was duly incorporated under the Membership Corporations Law of the State of New York, and became the Radio Club of America, Inc.

After the huge success of the seventeenth anniversary banquet in 1926, at which Prof. Pupin was the guest of honor, it was decided to hold regular annual affairs of this sort in the spring of each year. This rule was rigidly adhered to for several years, much to the enjoyment of all concerned, but in later years, due no doubt to the well known depression, a decided deviation occurred. The last annual dinner was held in 1931, and as a matter of record a full list of all club banquets is given below.



18th anniversary banquet of the Radio Club of America, Inc., Hotel McAlpin, N. Y. C., 1927.

Oldest Radio Club Holds Banquet

The nineteenth anniversary of the Radio Club of America was celebrated with a banquet at the Hotel McAlpin last night at 7:30, to mark the founding of what is probably the oldest radio club in the world.

Robert H. Marriott, honorary member of the club and past president of the Institute of Radio Engineers was the honorary guest. The toastmaster's duties were managed by Harry Sadenwater, radio operator on the NCI in the first transatlantic flight, who is now broadcast engineer of the General Electric Co. at Schenectady

New York Telegram, June 2nd, 1928.

1926 May 12th, Hotel McAlpin, 17th anniversary. Guest of honor Prof. M. I. Pupin.

1927 May 12th, Hotel McAlpin, 18th anniversary. Guest of honor George F. McClellan N.B.C.

1928 June 1st, Hotel McAlpin, 19th anniversary. Guest of honor R. H. Marriott.

1929 May 15th, Hotel McAlpin, 20th anniversary.

1929 Oct. 4th, Hotel McAlpin, special testimonial dinner to Captain Henry J. Round of England.

1931 April 21st, 22nd anniversary Beefsteak Dinner at the Elks Club in Brooklyn.

This brings our story up to modern times, and before closing let us once more scan the activities of the grown-up small boys who were responsible for the club's beginning. The accompanying photographs of typical amateur experimental stations of the period 1932-1934, certainly give an idea of the tremendous progress which has been made over the span of twenty-five years. The small boy now has become a veritable scientist. New developments have come thick and fast and he has embraced them with the same zest and thirst for knowledge with which he welcomed the advent of the electrolytic detector and the rotary gap.

Of course the frequencies in use today are vastly different from the early hit or miss days, the allotted amateur bands now being: 160, 80, 40, 20, 10, and 5 meters. The equipment now consists of, crystal controlled master oscillator power amplifier transmitters, producing the steadiest of C. W. signals, and short wave superheterodyne receivers with crystal filters. The antenna systems are also carefully designed from formulas, of the matched impedance type, for the exact operating frequency. Naturally the achievements of such stations, which are in

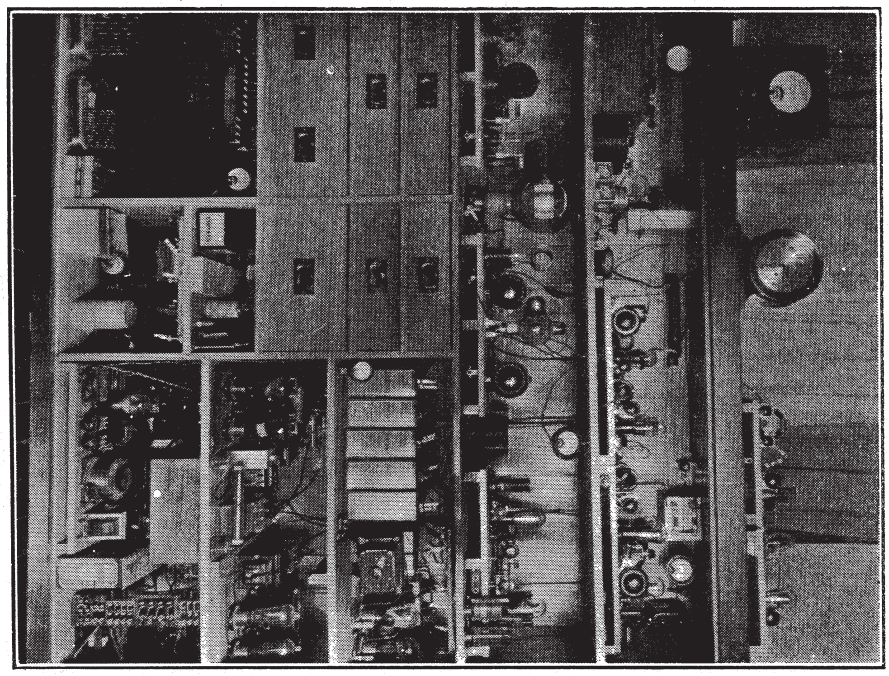
fact practically the equal of any commercial station in design, are astounding, particularly in reliability and annihilation of space, but unfortunately space will not permit their recording on these pages.

Both the stations illustrated, are equipped with the very latest systems of modulation, and radio telephony, on all frequencies permitted by law, is used most of the time. Of special interest is the 5 meter or 60 megacycle telephone. This new field of endeavor took the amateur by storm, and nightly, numerous duplex conversations can be heard over distances of 30 miles or more. The apparatus shown is of the master oscillator power amplifier type, and the receivers employ the Armstrong super-regenerative circuit. The fascination of duplex telephony is obvious, and particularly on these ultra short waves, because of the absence of static interference and fading. The greatest distance covered so far has been about 100 miles, at which duplex contacts have been maintained quite successfully. This would seem to be rather a meager performance, as compared with the

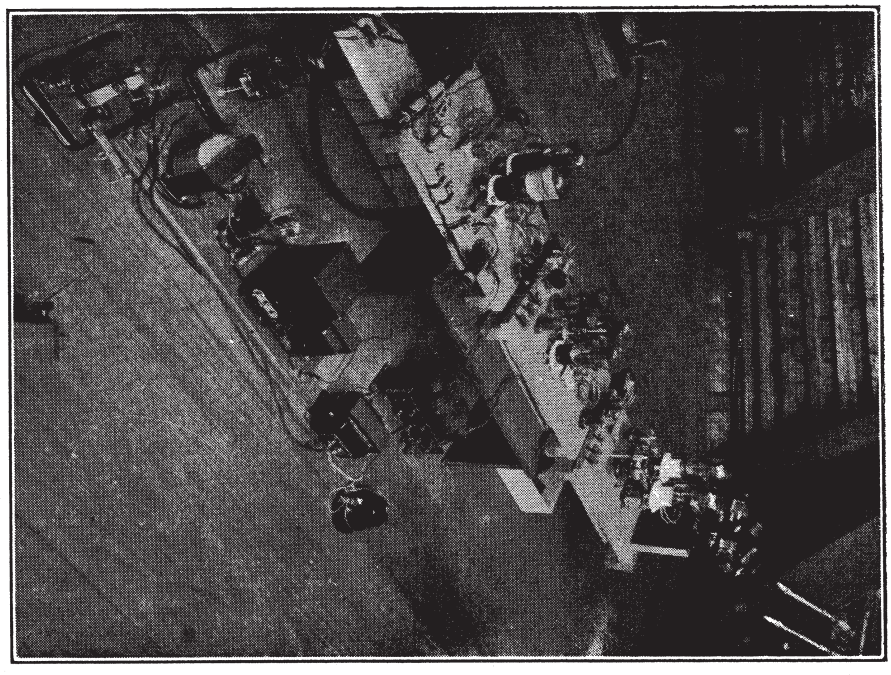
Receiver, station "W2AG," C. R. Runyon, Yonkers, N. Y., 1933. Note—single signal short wave superheterodyne center, and super-regenerative 5 meter receiver on the right. Randy Runyon was the first amateur to develop and use the single signal superheterodyne receiver, which is now the last word in C. W. reception.

distances covered on other frequencies, but when we consider the inauspicious beginning of 20, and 40 meter transmission and the tremendous progress made in a short time, the future for 60 megacycles looks very bright indeed. In fact new developments are coming at such a rate of speed that, if one remains idle for a month or two, one becomes a horrible greenhorn all over again. Even at the present writing, several amateurs, notably our old friend Randy Runyon, are maintaining successful telephone communication over some thirty miles, on two and one-half meters with beam transmitters.

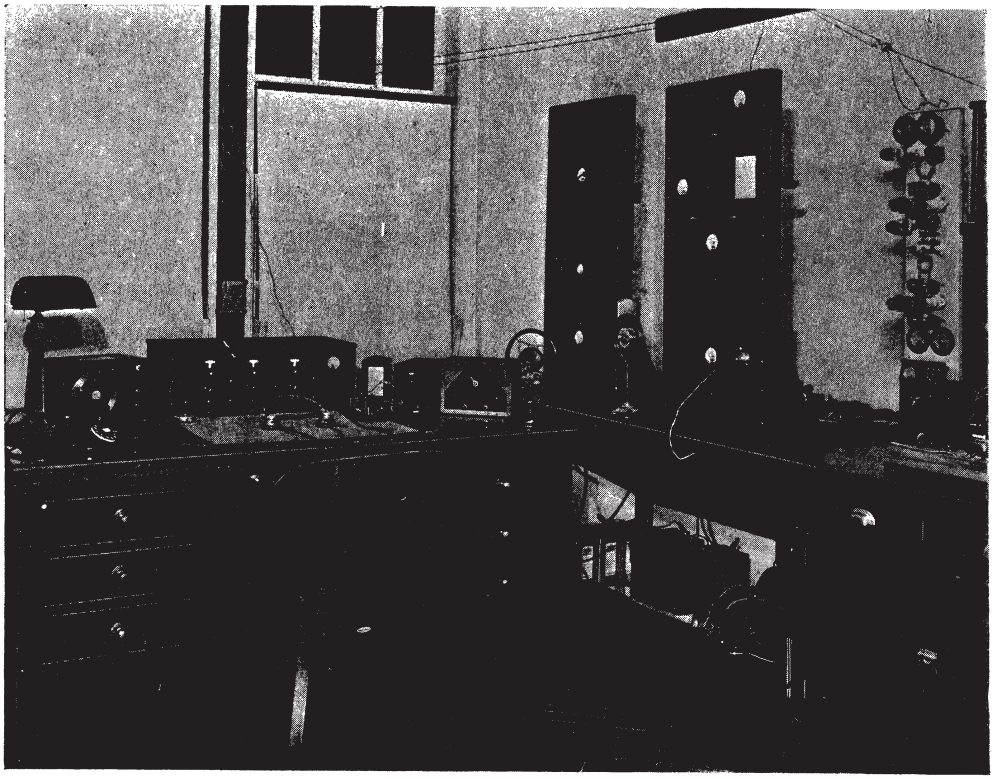
This most certainly shows the results of that undying zeal and love for radio, which has imbued these once small boys since the beginning. It is our one hope that this ardor may never be dampened, and that by example and sharing of knowledge this same spirit may be passed on to those who come afterwards.



Transmitter of "W2AG". C. W. crystal controlled M.O.P.A. 900 watts.



5 meter master oscillator power amplifier transmitter at "W2AG", 1933.



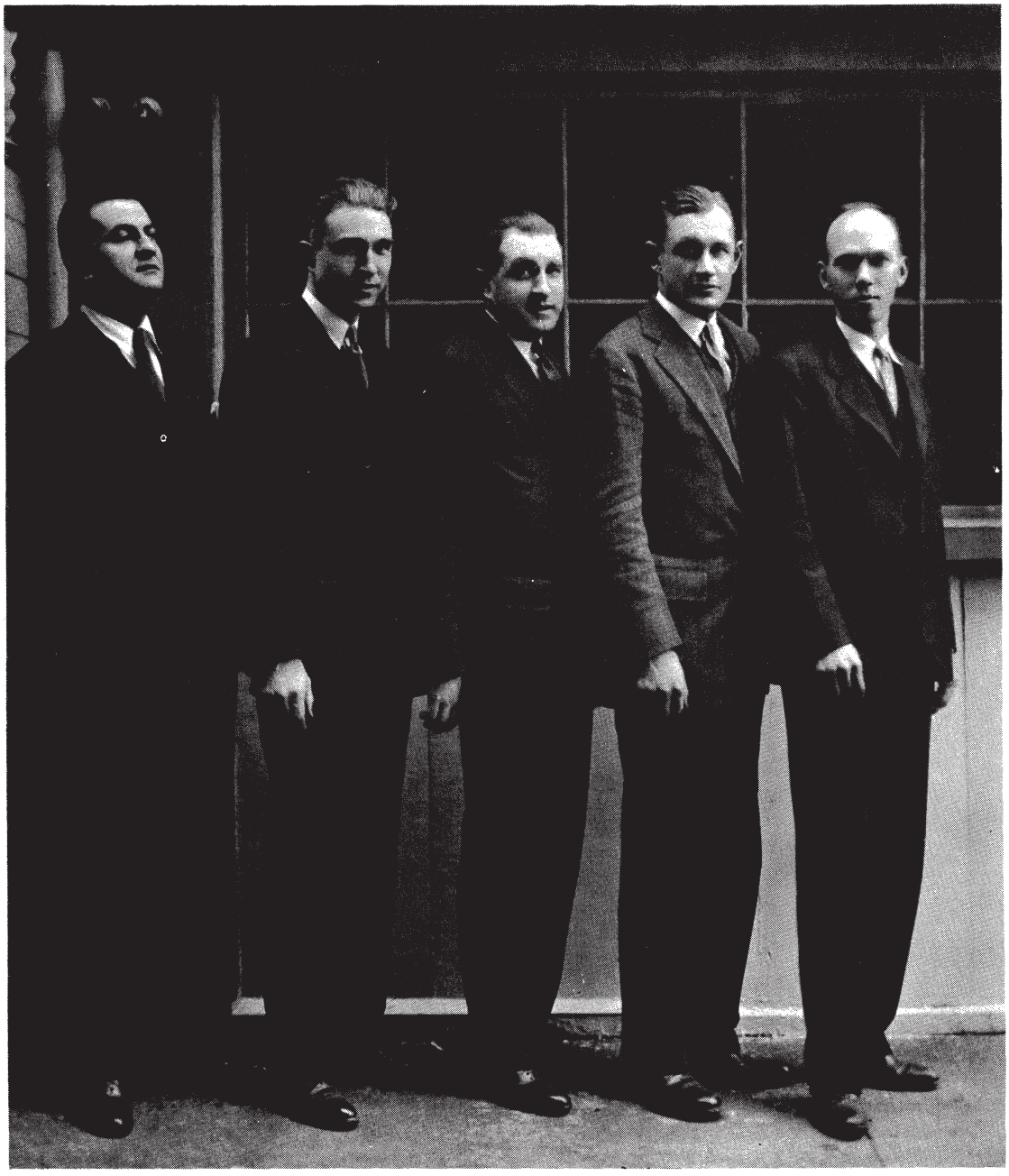
Station "W2GEC". G. E. Burghard, 520 East 86th St., N. Y. C., 1934. Left to right: Frequency meter, single signal superhet, 5 meter super-regenerative receivers, Modulator panel, C. W. transmitting panel, 20 to 180 meters, and 5 meter M.O.P.A. transmitter.

In conclusion, let us say, that this History was written with a twofold purpose. First, to chronicle as accurately as possible the most interesting club events of the past twenty-five years, and secondly to try and give a general idea of the development of the small boy who was responsible for its beginning. We have purposely omitted, with but a few exceptions, the recording of the many truly great scientific, literary, and engineering achievements of the members, because of their unweildly nature. Some idea of their magnitude can be gained, however, by browsing through other sections of this volume i.e. "Proceedings" and "Who's Who".

We fully realize, that the apparent character of the club has, quite naturally, changed with the years. The Radio Club has become a respected scientific body, but the spirit of friendliness and cooperation which lies deep within, has never changed, and our old friend, Professor Pupin, very beautifully complimented us on this rare quality, at the Seventeenth Anniversary Banquet, when he said:

> *"You love this art for its own sake and not for what profit it brings you. If I thought otherwise I would not be with you this evening."*

Therefore, permit us to say, that, if these pages have succeeded in arousing in the older members and instilling in the newer ones, that spirit of friendliness, cooperation and unselfish desire for radio knowledge, which was the prime factor of our beginning, and is the sole reason for our continued existence; then, this story has more than accomplished its purpose.



Charter members of the Radio Club of America lined up before the radio shack in Frank King's back yard at 326 West 107th. Street, New York. It was here that the special meeting of the Junior Wireless Club was held on October 21, 1911, when the name was changed to The Radio Club of America. Left to right: John Grinan, Frank King, George Burghard, Ernest Amy, Faitoute Munn. The picture was taken in 1929.